

Journal of
Pathology and Bacteriology

Journal of
Pathology and Bacteriology

The Journal of Pathology and Bacteriology

The Official Journal of
the Pathological Society of
Great Britain and Ireland

EDITED BY
W. F. STOKES, F.R.C.P.
CONSULTING EDITOR



FOUNDED IN 1857 BY GEORGE SIMS WOODHEAD

VOLUME FORTY FOUR

Oliver and Boyd

London 33 Paternoster Row, E.C.
Edinburgh Tweeddale Court

1937

PRINTED IN GREAT BRITAIN BY
OLIVER AND BOYD LTD EDINBURGH

CONTENTS

No 2—March

	PAGE
CAMERON, G R, J C THOMAS, S A ASHMORE, J L BUCHAN, J H WARREN and A W MCKENNY HUGHES, The toxicity of certain chlorine derivatives of benzene, with special reference to o dichlorobenzene (plates XXVII and XXVIII)	281
CAMERON, G R, W A E KARUNARATNE and J C THOMAS, Massive necrosis (' toxic infarction ') of the liver following intra portal administration of poisons (plate XXIX)	297
BIGCART, J H, The anatomical basis for resistance to pituitrin in diabetes insipidus (plate XXX)	305
COLES, ALFRFD C, Intra endothelial bodies in the vessels of the brain and spinal cord in rabies (plate XXXI)	315
BLACKLOCK, J W S, K J GUTHRIE and I MACPHERSON, A study of the intestinal flora of children	321
WHITEHEAD, H R, and G J E HUNTER, Observations on the activity of bacteriophage in the group of lactic streptococci	337
HIRSCH WILLI, The agglutinability by trypanflavine of <i>B typhosus</i> and its relation to the Vi antigen	349
RHODES, A J and C E VAN ROOYEN, Some cytological features of vaccinal keratitis in the rabbit (plate XXXII)	357
OAKLEY, C L, Frozen sections of eyes (plate XXXIII)	365
D AVOY RIGNEY, and FLORENCE L EVANS, The histology of the normal chorio allantoic membrane of the developing chick embryo (plates XXXIV XLI)	369
WALBUM, L E, and G C REYMAN, The production of toxin by <i>Clostridium oedematiens</i> (<i>B novyi</i>)	379
MAGNUS, H A, Observations on the presence of intestinal epithelium in the gastric mucosa (plates XLII XLIV)	389
BECK, A, The occurrence of protective antibodies in syphilis	399
FINDLAY, G M, and F O MACCALLUM, An interference phenomenon in relation to yellow fever and other viruses	405
PROOM, H, The inter relationships of staphylococcal leucocidins	425
GILMOUR, J R, and W J MARTIN, The weight of the parathyroid glands	431
VAUX DOROTHY M, Malignant tumours of the thyroid gland (plates XLV XLVIII)	463
CLEARKIN P A, The effect of colchicine on normal and neoplastic tissues in mice	469
BURROWS, HAROLD Changes induced by œstrone in the bulbo urethral (Cowper's) gland of the male mouse (plates XLIX and L)	481
ALVES WILLIAM <i>B asiaticus</i> its relation to <i>B coli</i>	485

patic trunks) are replaced, i.e., *the only right hepatic present*. The inexcusable ligation of such an artery during cholecystectomy deprives the right lobe of its blood supply and may readily be the direct cause of grave morbidity and death, as was forcefully emphasized by the British surgeon Gordon-Taylor. Severance of a common hepatic artery of superior mesenteric origin (5 cases) during pancreaticoduodenal resection, of a common hepatic of superior mesenteric origin (5 cases) during pancreaticoduodenal resections or of a common hepatic trunk arising directly from the left gastric artery (1 case), would result in immediate death of the patient.

Despite the complexity and varied character of the hepatic arterial blood supply, any sample of it may, with minor modifications, be categorized into one of the following ten basic types:

The celiac hepatic artery supplies:

1. The right, left, and middle hepatic

(textbook type and present only in about half (55 per cent) of the subjects (Fig. 2A).

2. The right and middle hepatic—the left hepatic replaced from the left gastric; 10 per cent (Fig. 2B).
3. The left hepatic and middle hepatic—the right hepatic replaced from the superior mesenteric; 11 per cent (Fig. 2C).
4. Only the middle hepatic—the right hepatic replaced from the superior mesenteric, the left hepatic replaced from the left gastric; 1 per cent.
5. The right, middle and left hepatic—left hepatic small, hence an accessory left hepatic from the left gastric; 8 per cent (Fig. 2D).
6. The right, middle and left hepatic—right hepatic small, hence an accessory right hepatic from the superior mesenteric, etc.; 7 per cent (Fig. 3A).

made by the right (18) and left (47) gastropiploic arteries are shown. About the head of the pancreas are an anterior and a posterior pancreaticoduodenal arcade made respectively by the superior pancreaticoduodenal (18) and the *retroduodenal* (posterior superior pancreaticoduodenal) artery (16). Both arcades join the superior mesenteric artery (65) via a common inferior pancreaticoduodenal (63). The artery of Wilkie (15) to the first part of the duodenum has had a section of it removed. The splenic artery (38) is characteristically tortuous and distally gives off a superior polar artery (40) to the spleen before dividing into its superior and inferior terminal branches.

Near the junction point of the splenic vein (39) with the superior mesenteric vein (65) is the *dorsal pancreatic artery* (33). After supplying the neck region of the pancreas it gives off the *transverse pancreatic artery* (35) which courses along the inferior surface of the pancreas, at the tail end of which it anastomoses with the a. pancreatica magna (41) of the splenic and with the a. caudae pancreatis (46) from the left gastropiploic (47). To the right it anastomoses with the superior mesenteric (65).

The anterior and posterior walls (52) of the inferior recess (55) of the omental bursa in the great omentum are shown. Situated in the posterior wall of the great omentum below the transverse colon (51) is the large *epiploic arc of Barkow* (58), the left limb of which is made by the left epiploic (54) from the left gastropiploic (47). The right limb is not shown but is made by the right epiploic from the right gastropiploic (13). Descending branches or anterior epiploic arteries (72) from the infragastric arterial circle end in the arc, as do some of the descending branches or posterior epiploic arteries (73) given off by the transverse pancreatic (35) coursing in the pancreas. The arc gives an additive blood supply to the transverse colon (51).

The *retroduodenal artery* (16) after its origin from the gastroduodenal (14) swerves around the common bile duct (17), supplying it and the ampulla of Vater in its course. The retroduodenal arcade with its branches to the back of the duodenum (26), here turned forward, is faintly visible behind the head of the pancreas.

A portion of the body of the pancreas (36), as well as a portion of its head (71) have been cut away. At the latter site is shown the union of the pancreatic duct (19) with the common bile duct (17). The major part of the stomach has been removed to show the retrogastric space of the omental bursa (34), bounded dorsally by the pancreas. The foramen of Winslow (28) leads into the vestibule of the omental bursa (24), where is visible the caudate lobe of the liver (25). Relations of the portal vein (12) to the hepatic arteries and bile ducts are shown, including the tributaries arising in the umbilical fossa (1).

	PAGE
KENNEDY, WALTER P , and IAN MACKAY, The macropolycyte in health and disease in Iraq (plate LXXXII)	701
PULLAR, E MURRAY, A simple and efficient water trap for a water suction pump	705
WHITE, P BRUCE, The O receptor complex of <i>V cholerae</i> and its antibodies	706
BOOKS RECEIVED	711
INDEX OF SUBJECTS	715
INDEX OF AUTHORS	718

Fig. 3.—A, type with an accessory right hepatic (*AcRH*) as the hepatic divides into left, middle, and right branches. Since the celiac right hepatic gives off only the cystic (*C*) and a very small liver branch, an accessory right hepatic (*AcRH*) from the superior mesenteric supplies the right lobe; before doing so, it anastomoses with the right hepatic. The *retroduodenal* (*RD*) is a branch of the hepatic and not of the gastroduodenal, *thereby justifying its own terminology*. It descends anterior to the common bile (*CBD*), forms an extensive arcade on the posterior surface of the duodenum and head of the pancreas, then unites with the accessory right hepatic via its own inferior pancreaticoduodenal (*IPD*). The cystic duct (*CD*) joins the common hepatic duct anteriorly and to the left; it is dangerously close to the accessory right hepatic (*AcRH*). The latter gives off the supraduodenal (*SD*), which anastomoses with the retroduodenal. Single cystic artery with typical distribution of its superficial and deep branch. B, type in which the liver has five major arteries, three from the celiac hepatic and two accessory hepatic arteries (accessory right hepatic (*AcRH*) from the superior mesenteric (*SM*), the accessory left hepatic (*AcLH*) from the left gastric (*LG*)). The deep cystic (*DC*), after giving off a liver branch and supplying the attached surface of the gallbladder, rami-fies in areas beyond it as a relatively large liver artery. The cystic duct (*CD*) is long (6 cm.) and serves posterior to the hepatic duct with which it is intimately united with connective tissue for 7.5 cm. before opening into the common bile duct (*CBD*). Note how the accessory right hepatic (*AcRH*), most likely the posterior segmental branch of the right lobe, enters the fissured area under the gall-bladder and how readily it may be mistaken for the cystic. C, type without a celiac hepatic. The entire blood supply of the liver comes from the superior mesenteric (*SM*) via a replaced common hepatic, the right branch of which courses upward dorsal to the porta veia (*PI*). Note close relation of the cystic artery (*C*) to the large liver artery (most probably the posterior segmental branch of the right hepatic [*RIL*]), as latter enters the fissured area under the gallbladder. Such a common hepatic may pass through the head of the pancreas, where it inadvertently may be severed. The retroduodenal arcade here is double; the upper unites with the gastroduodenal, the lower with the superior mesenteric via its own inferior pancreaticoduodenal (*IPD*). D, hepatic trunk from left gastric; surgically considered, very dangerous in partial or total gastrectomy. Here the entire blood supply of the liver and gallbladder comes from the left side, i.e., from the left gastric via a replaced hepatic trunk which ran at the periphery of the lesser omentum and on opening the abdomen was largely hidden from view. The cystic arises from the middle hepatic (*MH*) and after crossing the hepatic duct divides into its superficial (*SC*) and deep branch (*DC*). Surgically considered, it is important to know that the middle colic (*M.Col.*) may arise from the celiac, and give origin to the dorsal pancreatic, as here. Branches of the left inferior phreatic artery supply the esophagus.

here, except in summary. Of great import in the search for the cystic artery is the fact that in nearly 20 per cent of the 200 cases no cystic artery had its origin in Calot's triangle, while in 80 per cent there was always the origin of a cystic in the triangle, either the single cystic, the superficial branch, the deep branch or both branches. Cystic arteries arising from a typical celiac right hepatic in the triangle comprised: single cystic, 43 per cent; double cystic, 11.5 per cent, and either the superficial or the deep branch, 8 per cent—a total of 63 per cent. Aberrant right hepatics gave rise to the cystic in the triangle in 18 per cent. The single cystic, its superficial or its deep branch arose from the right hepatic to the left of the hepatic duct in 19.5 per cent; from the left hepatic, middle hepatic or common hepatic in 6.5 per cent and from the gastroduo-

cially the deep cystic, from an aberrant replaced right hepatic artery from the superior mesenteric occurred more frequently (11 per cent) than from a hepatic artery of similar origin which was accessory (3 cases). Of the 50 cases in which dual cystic arteries were observed, only 2 did not reveal the origin of a cystic artery from the right hepatic in Calot's triangle.

The Biliary Ducts.—Variations in the bile ducts are of such frequency and of such pronounced character as to be of vital concern to every surgeon. A disregard of the anomalies, especially of accessory hepatic ducts, courts injury to them, with resultant disconcerting postoperative leakage of bile. That the majority of benign strictures of the common duct are due to surgical injury during cholecystectomy is well known and has recently again been emphasized by Lahey, Wilson and Gilles-

and three years old Two and a half years previously this fowl and three others had intravenous injections of a suspension of the endothelioma MH2 No trace of this tumour was found in any of them

There was a fusiform enlargement of the oviduct with a maximum diameter of about 2 cm, tapering gradually at each pole into normal oviduct There were innumerable growths in the visceral peritoneum, especially in the neighbourhood of the duodenum and pancreas, and the latter was invaded All the growths conformed closely to one pattern (figs 3, 4 and 5), and consisted of sharply circumscribed masses of tumour cells with a varying but usually small amount of intervening stroma In some of the masses rudimentary lumen formation could be detected, but this was nowhere conspicuous Individually, the cells were clearly outlined and contained a large vesicular nucleus with a prominent nucleolus The growth is a carcinoma which originated most probably in the oviduct

Methods

Inoculations were made always into the pectoral muscles In some of the earlier passages (0→1, 2E→3A, 4B→5B) fragments of tumour were inserted by means of a transplanting trocar and cannula, while in others (1→2E, 3A→4B) minced tissue was injected with a syringe From the sixth passage onwards the standard procedure, rarely modified, was to inject 0.05 c.c. of minced tumour The chickens were of various breeds, large numbers being crosses of rhode island red with light sussex or white wyandotte, and in age varying usually from a few days to a few weeks

The birds were examined weekly and the approximate size of the tumours recorded All tumours used for transplantation and most of the others were examined histologically The most valuable staining method was one based on the method for staining the ground substance of cartilage by vesuvine The stain was prepared according to the formula of Langeron (1925), using bismarck brown (Gurr) for vesuvine It was found that the utility of the method was greatly increased by first staining with Weigert's iron hæmatoxylin and finally counterstaining with acid fuchsin

Transmission by grafts

The course of transmission is shown in fig 1, which provides a record of the birds used and the incidence of progressive and temporary growths in them

In the first transplantation, tumour fragments were inoculated into twenty-four chickens, of which three developed progressive

superior mesenteric artery as first jejunal branch via a common retropancreaticoduodenal artery. Each arcade has its own retropancreaticoduodenal, that of the posterior arising at a higher level than that of the pancreas.

Ramifications of the retropancreaticoduodenal artery about the supraduodenal, retropancreaticoduodenal and intrapancreatic portion of the common bile duct accounts, in a large measure, for the rich vascularization of the common duct, the latter again is crossed near its distal end by several branches from the retroduodenal arcade. The posterior arcade comes to perfect display with mobilization of the duodenum and removal of a thin film of connective tissue (Toldt's fascia, remnant of the primitive mesoduodenum) that overlies it and the retroduodenal venous arcade. The latter is superficial to the arterial arcade and drains into the portal vein.

The retroduodenal artery is of decided surgical importance, for the following reasons:

1. The entire cystic artery (2 cases) or its superficial branch (6 cases) may arise from it.
2. In incisions of the common duct for removal of gallstones it may readily be injured, for it crosses its supraduodenal portion anteriorly.
3. One or two end branches of its arcade often cross under the superior mesenteric artery to supply the first part of the jejunum, a point to be remembered in gastrojejunostomies, lest the first part of the small bowel be deprived of its blood supply.
4. In ligations, explorations and transplantsations of the common bile duct, especially of its intrapancreatic portion, the retroduodenal artery should be taken note of in order to avoid annoying hemorrhages.
5. In hidden bleeding that follows spontaneous rupture of the posterior duodenal wall by ulceration, the retroduodenal artery may be involved, more so than the supraduodenal or the gastroduodenal.

6. In many cases the retropancreaticoduodenal artery forms a suprapancreatic arcade with the supraduodenal artery of the pancreas with the right gastric artery, the latter supplying the critical arterial junction zone between the pylorus and the first part of the duodenum with a celiac plexus spray of twigs.
7. It may be anastomosed with the splenic or the celiac artery as a branch of the dorsal pancreatic artery which passes behind the common bile duct.

Relations of Arteries to the Biliary Ducts.—Relations of the biliary ducts to the right hepatic artery and its branches, especially the cystic, depend on the varied origin and mode of branching (early or late) and the course taken by the right hepatic. The following anatomic facts merit repeated recollection and didactic emphasis. In nearly 20 per cent of the cases the site of origin of the cystic artery is located outside the cystic triangle, i.e., the artery arises to the left of the hepatic or gastroduodenal artery and must accordingly, cross the bile duct system (usually the hepatic duct) to reach the triangle.

In the majority of cases the celiac right hepatic artery crosses the hepatic duct posteriorly, purely ventral crossings having been observed in only 12 per cent. In many instances the right hepatic is represented by two branches, one crossing the hepatic duct anteriorly, the other posteriorly. In cases of dual cystics, when the superficial cystic arises from an artery to the left of the hepatic duct (right, middle or left hepatic), it usually crosses the hepatic duct anteriorly. In such cases the deep cystic artery may arise in the triangle from an aberrant right hepatic derived from the superior mesenteric which, in its ascent to the triangle, crossed the common bile duct, often at the point of juncture of the cystic duct where it may be injured or severed. In 7 per cent of the cases the superficial cystic swung cau-

generation, when its continuance depended on a solitary growth (5B) This tumour was first detected a month after inoculation It grew slowly though fairly steadily during the next four months and then more rapidly, with a conspicuous acceleration during the final week, the fowl being killed when moribund twenty-seven weeks after inoculation The growth, originating in the right pectoral muscles, had spread to the left breast, where it provided a mass of almost equal size For the most part it was firm, but it contained some softer areas, probably of more recent growth The tumour had penetrated the thoracic wall, on the inner face of which there was a projecting mass of unusual type It was soft and differed from all tumours previously examined in being friable Histologically, however, it resembled the softer parts of the external growth Metastatic tumours were found in the lungs The inoculation of two samples of the softer parts of the external growth, each into eight chickens, produced no tumours, but tissue from the friable internal growth inoculated into eight chickens produced growths in four of them

This was the starting-point of a successful period extending over eight months (September 1935 to May 1936) during which the tumour was carried to the tenth generation The incidence of tumours was high and of regressions low, but in some series failures still occurred In May 1936 there was a sharp set-back, with a fall in the incidence of tumours and a serious increase in the number of regressions, as shown in the eleventh and twelfth passages in fig 1 The onset of this phase coincided with a troublesome decline in the general health of our stock of fowls The mortality during the early stages of tumour growth was unduly high and many birds which survived were in poor condition During the same period there was a comparable deterioration in the growth of some other tumour strains

Growth and dissemination of the transplanted tumours

For the sake of clarity it is convenient to describe separately first the growths of the first five passages and then the later growths

Early generations

The tumour of the fifth generation, already described in detail, was in most ways fairly representative of the earlier tumours They appeared usually about a month after inoculation, though one of the first generation was not detected until five months had elapsed Tumours which became palpable within a fortnight subsequently retrogressed Eight tumours ran a complete clinical course to cause death or grave illness of the host Thus they did in six to eleven months after inoculation, with one exception where

plificada. Acentua que os aspectos são perpetuamente diversos, fato que deve ser levado em consideração quando se planeja realizar operações importantes nesse órgão. Atendendo a que o fluxo arterial é tão imprevisível e porque existem tantas variações, poucos vasos colaterais devem ser atingidos nos casos em que é necessário contar com uma circulação colateral depois da ligadura da artéria principal. De forma alguma pode-se admitir que a ligadura da grande artéria hepática seja realizada impunemente. De acordo com os estudos feitos por Behrend, Gordon-Taylor, Vaughn, Gray, e Ramstrom, algumas das chamadas mortes de causa hepática após as colecistectomias, dão atribuídas a lesão, ligadura ou pinçamento da artéria hepática direita. A eficiência atual das vinte e seis colaterais do fígado só poderá ser determinada por estudos futuros, nos quais se incluem a experimentação nos animais, as pesquisas arteriográficas e a necropsia.

RESUMEN

El autor describe en detalle la Michels complicada y constante variedad de abastecimiento sanguíneo hepático, incluyendo la circulación colateral. Gran énfasis es puesto en el hecho que el cuadro es continu-

amente variado y que esto hecho debe ser recordado y considerado con la mayor seriedad cuando una operación mayor es llevada a cabo. Como la circulación hepática es tan poco definida y porque existen muchas variaciones anatómicas se puede confiar solo en pocas de los canales colaterales para establecer una adecuada circulación que compense en el hígado cuando el tronco principal hepático común del tronco celiaco ha sido ligada. Por lo tanto en ninguna circunstancia debe considerarse que la ligadura de la artéria hepática pueda efectuarse impunemente. De acuerdo con los estudios de Behrens, Gordon-Taylor, Vaughn, Gray, y Ramstrom, algunas de las llamadas muertes hepáticas, consecutivas a una colecistectomía, son atribuidas a sección, ligadura o pinzamiento de la artéria hepática derecha. La verdadera eficiencia de los 26 conductos colaterales del hígado solo podrán determinarse en estudios posteriores, incluyendo experimentación animal investigación arteriográfica y autopsias.

BIBLIOGRAPHY

Michels, N. A.: *The Blood Supply and Anatomy of the Upper Abdominal Organs with a Descriptive Atlas*. Philadelphia: The J. B. Lippincott Company, 1955.

Sometimes give your services for nothing, calling to mind a previous benefaction or present satisfaction . . . For where there is love of man, there is also love of the art. For some patients, though conscious that their condition is perilous, recover their health simply through their contentment with the goodness of the physician.

—Hippocrates

but other tumours (*e g* no 4) killed their hosts by metastasis without any conspicuous acceleration. Regression occurred after varying periods of growth (nos 2 and 3), and once (no 2) a relatively large tumour was absorbed with surprising speed. Fowls 2 and 3 (fig 2), in which tumours had retrogressed, were successfully re inoculated in the contralateral breast. Fowl 2 is of especial interest. The tumour increased slowly up to 54 days after inoculation and was then stationary for a fortnight. During the next week it was

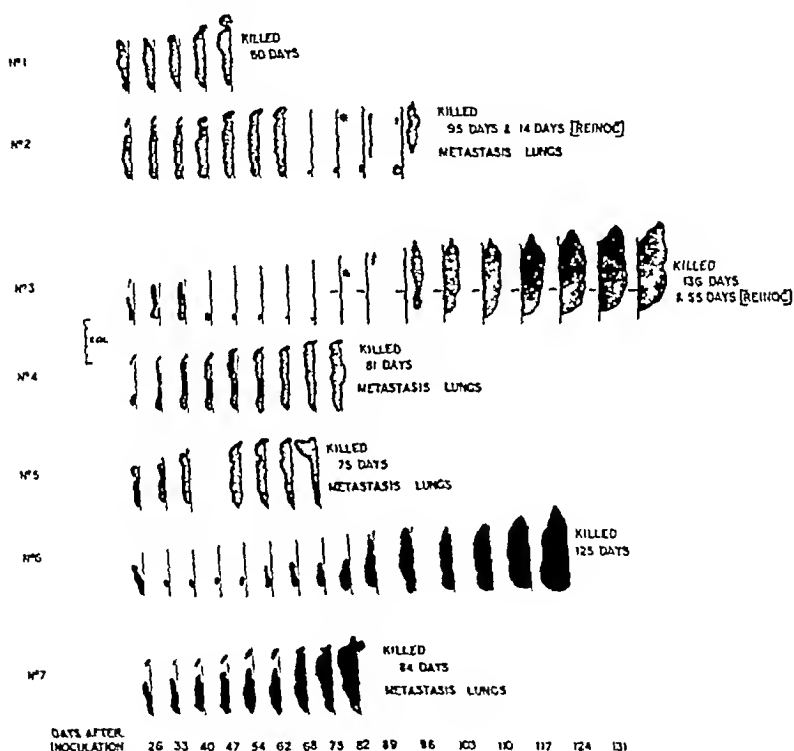


FIG 2—A series of eighth generation tumours (8C), excluding fowls which died within 30 days of inoculation. Nos 2 and 3 were re inoculated in the contralateral breast 81 days after the original inoculation (indicated by asterisks). The vertical lines represent the sternal keels and illustrate the growth of the fowls during the experiment.

reduced to a small nodule. Another week later the nodule, as shown in fig 2, was slightly larger. A second inoculation then made into the left breast produced a tumour, and the surviving portions of the earlier tumour also grew considerably. The fowl was moribund 95 days after the first inoculation and 14 days after re inoculation, and at autopsy the lungs were almost completely replaced by tumour. No other metastatic growth was found less than 44 days after inoculation of the primary, and although in

which favor the development of subcutaneous fibrosis in an area rendered vulnerable by the presence of chronic edema.

Clinical Manifestations. — The clinical manifestations that accompany the postphlebitic leg secondary to deep venous thrombosis will differ from the postphlebitic manifestations of primary varicose veins, both in degree and in character, because of complications in the former due to physiologic disturbances of deep venous return, the greater degree of reversed circulation in communicating veins, and vasomotor disturbances induced in perifibrosis of the neurovascular bundle, and also because of the greater amount of lymph stasis.

Typically, postphlebitic ulceration occurs adjacent to the malleoli, especially the internal, frequently on the lateral but rarely on the upper portion of the leg.

The outstanding subjective complaint is pain, which may be (1) the orthostatic pain of chronic venous insufficiency; (2) neuritis of the long saphenous nerve, or (3) causalgia accompanied by vasomotor disturbances.

The procedures used in the surgical treatment of the postphlebitic leg with reference to a direct attack on chronic venous insufficiency are:

1. Ascending functional venographic studies.
2. Surgical management of the greater and lesser saphenous systems.
3. Complete eradication of incompetent communicating veins.
4. Deep vein ligation.

Ascending Functional Venographic Studies: Ascending functional venographic studies will determine the state of: (1) the deep venous system with respect to recanalization and degree of functional integrity; (2) communicating veins with respect to location, size and degree of incompetence, and (3) superficial veins with respect to functional integrity.

The technic used is a modification of procedures previously described.²

The patient is placed on the roentgen table with the foot rest in position and table tilted to 75 degrees, with the feet down. A tourniquet is placed slightly above the ankles to obstruct the superficial veins.

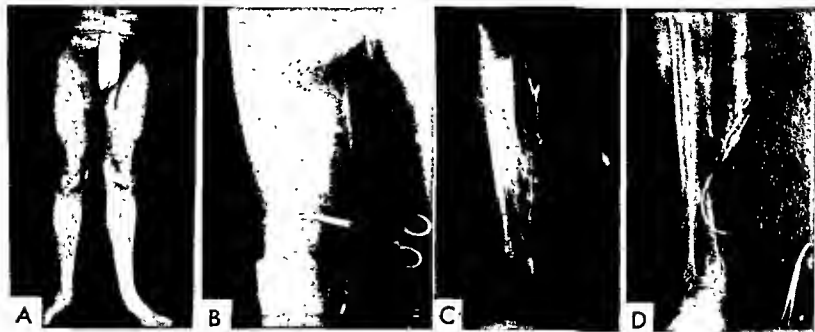


Fig. 2.—A, postoperative photograph of patient six months after ligations of bilateral superficial femoral vein and vena cava for recurrent pulmonary embolism following superficial thrombophlebitis with extension to the deep venous system. Note lack of edema and other evidence of chronic venous insufficiency. B and C (Case 1), failure of deep venous system to become visible. Superficial system is adequately filled; D, superficial veins are emptied partially after exercise.

a query at the upper left hand border of fig 1) After 201 days this tumour only attained a size of approximately $3 \times 2 \times 2$ cm and on section had the appearance and consistency of fibrous tissue. It was transplanted into ten chickens, and although subsequent histological examination revealed no trace of carcinoma, two tumours arose in the inoculated birds. Their progress was now, like that of their parent tumour. The more vigorous had attained a size of roughly $12 \times 6 \times 6$ cm 399 days after inoculation, and the other bird was killed. The other was but $5 \times 2 \times 2$ cm when it was killed 406 days after inoculation. Each of these tumours was hard and apparently fibrous, like the tumour from which they derived, and each was transplanted. At present, 105 days after inoculation, there is a small nodule in one of the inoculated birds, and a small growth was found in one which succumbed to intercurrent disease 46 days after inoculation. This and the three growths previously mentioned were alike histologically, but contained no recognisable epithelial tissue. The fibrous tissue which preponderated did not form a capsule but extended between the muscle bundles at the periphery of the growths. Well-preserved muscle fibres were present throughout the tumours, but there were also transitional forms between almost normal striated muscle cells and plump spindle cells without striæ, and the latter cells sometimes formed aggregates of considerable size. The histological appearances of the first growth did not demonstrate certainly that the tissue was neoplastic. Its neoplastic nature was indicated by the close reproduction of its structure in daughter tumours. It now appears that a fibrosarcoma or fibromyosarcoma arose at the site of implantation of carcinoma tissue, probably after the latter had grown temporarily and regressed.

FACTORS IN SUCCESSFUL TRANSPLANTATION

It may be seen from fig 1 that the results of transplantation were grossly irregular. In the earlier passages this was not surprising, for many new tumour strains have a phase of irregular and difficult transmission before attaining their definitive behaviour. With the present tumour irregularities have persisted. While one series might yield almost 100 per cent progressive tumours the next might yield none at all. The precise importance of size and subdivision of dose as well as age and breed of fowl, was not clearly shown, but in most experiments these factors were standardised within narrow limits and evidently were not decisive. The two essential factors are the quality of the inoculum and the susceptibility of the host.



Fig. 6 (Case 5).—A, film demonstrating large incompetent communicating veins of both greater and lesser saphenous systems. Deep venous system in leg is incompletely and irregularly filled, but some valve stations are demonstrated. B, normal femoral vein is visualized above knee. C, venogram taken after exercise shows large communicating veins of lesser system and dye diffused into small superficial veins, with fair clearance of deep system.

CASE 4.—A. A. (Fig. 5) had a postphlebitic leg after repeated attacks of thrombophlebitis involving the lower portion of the greater saphenous system. Induration, pigmentation and dermatitis were observed on the medial aspect of the lower half of the leg. An ascending functional venogram showed incompetent communicating veins and irregular filling and narrowing of both superficial and deep systems in the lower half of the leg. The deep system in the upper half of the leg was well filled and appeared normal (Fig. 5A).

A venogram taken after exercise (Fig. 5B) demonstrated good functional response. A venogram taken after the injection of dye through a polyethylene catheter above the pathologic area (Fig. 5C) showed good caliber of the greater saphenous, with normal valve stations, as contrasted with the vessel in the lower part of the leg. Note that the dye passes up the greater saphenous vein without entering the deep system.

CASE 5.—E. T. (Fig. 6) had a postphlebitic leg. There had been recurrent attacks of superficial thrombophlebitis involving both the greater and the lesser saphenous system.

An ascending functional venogram showed the lumen of the greater saphenous vein de-

creased in caliber and irregular. Valve stations are not identified. Large incompetent communicating veins of both the greater and the lesser saphenous system are demonstrated.

The deep venous system in the leg was incompletely and irregularly filled, but some valve stations were well demonstrated (Fig. 6B). A normal femoral vein was visualized above the knee (Fig. 6C).

A venogram taken after exercise showed large communicating veins of the lesser system and dye diffused into small superficial veins with fair clearance of the deep system (Fig. 6A).

At operation a posterior stocking senn incision was made (Fig. 7). The greatly thickened and obliterated lesser saphenous vein was excised, and subfascial excision of communicating veins to both the greater and the lesser saphenous vein was performed as a first stage procedure.

Treatment.—Removal of the saphenous veins and their tributaries should be as nearly complete as possible when they are involved in the postphlebitic process.

The superficial veins, when contracted down and thickened in

a query at the upper left hand border of fig 1) After 201 days this tumour only attained a size of approximately $3 \times 2 \times 2$ cm and on section had the appearance and consistency of fibrous tissue. It was transplanted into ten chickens, and although subsequent histological examination revealed no trace of carcinoma, two tumours arose in the inoculated birds. Their progress was slow, like that of their parent tumour. The more vigorous had reached a size of roughly $12 \times 6 \times 6$ cm 399 days after inoculation, when the bird was killed. The other was but $5 \times 2 \times 2$ cm when the bird was killed 406 days after inoculation. Each of these growths was hard and apparently fibrous, like the tumour from which they derived, and each was transplanted. At present, 105 days after inoculation, there is a small nodule in one of the inoculated birds, and a small growth was found in one which succumbed to intercurrent disease 46 days after inoculation. This and the three growths previously mentioned were alike histologically, but contained no recognisable epithelial tissue. The fibrous tissue which preponderated did not form a capsule but extended between the muscle bundles at the periphery of the growths. Well-preserved muscle fibres were present throughout the tumours, but there were also transitional forms between almost normal striated muscle cells and plump spindle cells without striæ, and the latter cells sometimes formed aggregates of considerable size. The histological appearances of the first growth did not demonstrate certainly that the tissue was neoplastic. Its neoplastic nature was indicated by the close reproduction of its structure in daughter tumours. It now appears that a fibrosarcoma or fibromyosarcoma arose at the site of implantation of carcinoma tissue, probably after the latter had grown temporarily and regressed.

FACTORS IN SUCCESSFUL TRANSPLANTATION

It may be seen from fig 1 that the results of transplantation were grossly irregular. In the earlier passages this was not surprising, for many new tumour strains have a phase of irregular and difficult transmission before attaining their definitive behaviour. With the present tumour irregularities have persisted. While one series might yield almost 100 per cent progressive tumours the next might yield none at all. The precise importance of size and subdivision of dose as well as age and breed of fowl, was not clearly shown, but in most experiments these factors were standardised within narrow limits and evidently were not decisive. The two essential factors are the quality of the inoculum and the susceptibility of the host.

vorhebung der kommunizierenden Venen erörtert.

Die funktionelle ascendierende Venographie wird als ein wertvolles Hilfsmittel zur Auswahl einer rationellen chirurgischen Behandlung des postphlebitischen Unterschenkels angesehen, da dieses Verfahren die Bestimmung des funktionellen Zustandes des venösen Systems der unteren Extremitäten ermöglicht.

RÉSUMÉ ET CONCLUSIONS

Les séquelles tardives de la thrombose veineuse profonde ou de la thrombophlébite superficielle peuvent provoquer le syndrome dit du "lower leg."

Le traitement chirurgical du syndrome post-phlébitique peut être divisé en deux catégories: a) Procédés avant trait à l'insuffisance veineuse chronique per se. b) Procédés se rapportant directement aux séquelles de cet état. Ces techniques sont discutées.

L'auteur décrit les modifications physiopathologiques post-phlébitiques du membre inférieur, les manifestations cliniques de cette affection, ainsi que les facteurs physiologiques et anatomiques relatifs au retour veineux de l'extrémité inférieure, avec une mention spéciale quant aux veines communicantes.

La veinographie fonctionnelle ascendante est un guide précieux de la thérapeutique chirurgicale rationnelle, car elle permet de déterminer l'état fonctionnel du système veineux des extrémités inférieures.

SUMARIO E CONCLUSOES

As sequelas tardias da trombose venosa profunda e da tromboflebite superficial pode resultar na síndrome pós-trombotiva.

O tratamento cirúrgico das síndromes pós-flebiticas pode ser dividido em duas categorias:

(a) processos que visam a insuficiência venosa crônica isolada;

(b) métodos que visam diretamente as sequelas.

Esses métodos são discutidos pelo A. que também analisa as modificações fisiopatológicas na perna pós-flebite.

Descreve as manifestações clínicas e discute os fatores fisiológicos e anatomicos que interferem no retorno venoso da extremidade com referencia especial às veias comunicante.

A venografia ascendente funcional é analisada, considerando-a o A. um subsidio valioso para a terapêutica da síndrome pós-flebitica porque auxilia a precisar o estado funcional do sistema venoso.

RESUMEN Y CONCLUSIONES

Las secuelas tardías de las trombosis venosas profundas o de las tromboflebitis superficiales pueden dar como resultados el "síndrome del miembro inferior."

El manejo quirúrgico de los síndromes postflebiticos puede dirimirse en dos categorías:

a. Aquellos prodefimientos concernientes con la insuficiencia venosa crónica per se.

b. Aquellos prodecimientos que tratan directamente con las secuelas de esta condición.

Se discuten esos procedimientos.

Se consideran los cambios ocurridos en la pierna postflebitica.

Las manifestaciones clínicas se describen.

Los factores anatómicos y fisiológicos relacionados con la circulación venosa de retorno de la extremidad inferior se discuten con especial referencia a las venas comunicantes.

La venografía funcional ascendente se considera como una guía valiosa en

ureteral orifice being entirely disregarded. This patient too is entirely well three and a half years after treatment. The bladder of M. L., a woman, had a capacity of less than an ounce, owing to extensive leucoplakia of the bladder which had become an epidermoid carcinoma involving about two-thirds of the organ. Now, twenty months after treatment, she still has a bladder with normal mucosa and a capacity of $2\frac{1}{2}$ ounces.

In using radioactive cobalt in nylon sutures I have found that one can almost always excise enough of the intravesical portion of the growth so that the thickness of the vesical wall, infiltrated with tumor, is not more than 1 cm.; consequently, one can invariably obtain a planar implant. In making such an implant it is important to free up the bladder on the outside of the tumor, so that the sutures can be placed as near the outside surface of the bladder as possible. The object is to destroy the actively invading cells and to disregard the main tumor mass.

In freeing up the involved portion of the bladder, I have often been impressed by the fact that the tumor is much larger and more extensive than one would have guessed by seeing and feeling it from the inside of the bladder only. This observation explains why, many years ago, when I used low intensity radium needles or radium emanations, I was not always able to control the tumor. The reason now is obvious—working from the inside of the bladder, one could only guess but could not know for certain how much tumor there was.

In 1945 Brent Wayman³ introduced a new way of using radium needles in the treatment of carcinoma of the bladder. By inserting the needles from the outside of the bladder, he destroyed the tumor where it was invading normal healthy tissue, disregarding the large fungating mass that was growing within the lumen of the blad-



Fig. 2.—Postoperative roentgenogram showing CO60 pattern. Note biplanar implant used in this case.



Fig. 3.—Photograph showing large sessile tumor adjacent to ureteral orifice. Protruding mass was excised, and CO60 was sutured into base of tumor, with disregard of ureteral orifice. Patient still well three and one-half years after operation.

usually rotates on its vertical or antero-posterior axis; in the presence of acquired torsion, on its horizontal axis.

In a recent paper on the relation of trauma to nephroptosis we enumerated the most common mechanical etiologic factors: the erect position of man, peculiarity of body form, lack of muscle tone, diminished intra-abdominal pressure and inherent weakness of the supporting renal and perirenal fascia. In the normal adult there is slight upward convergence of the vertical axes of the kidneys, as the lower poles are displaced laterally by the iliopsoas muscle and the upper poles medially by the liver and spleen. The iliopsoas muscle mass causes an oblique backward shift of the horizontal axis to form a 40-degree angle with the midline of the body. As the kidney begins to descend it remains in its vertical position, but as the downward displacement increases the organ is held back by the vascular pedicle, which causes it to rotate on its horizontal axis (Fig. 4). When the upper pole is displaced backward and the inferior pole forward, the kidney takes on an oblique position. The degree of torsion depends on the length and attachment of the pedicle. The prolapsed kidney exerts traction, elongating, narrowing or compressing the vascular pedicle. Superimposed torsion may actually twist the renal vessels, constricting the renal artery and thereby causing ischemia. Renal torsion can also be caused by retroperitoneal tumor, perinephritic abscess, tumefaction of the liver and spleen, or intrinsic renal masses.

Hydrodynamics may also be a contributing factor. Increased intrapelvic pressure, which results from obstruction due to kinking of the upper portion of the ureter, is caused by ptosis of the kidney. In turn, the resultant increased intrapelvic pressure may compress and constrict the vascular pedicle itself. Davis recently pointed out that, in many cases, pelvic

hypertension can be corrected by operation.

Urologists with wide experience in the surgical correction of nephroptosis have observed that nephropexy relieved hypertension in certain patients (Abeshouse, Ritch and others). We, too, have observed this phenomenon for many years.

In 1940 McCann and Romansky made interesting observations on orthostatic hypertension. In studying hypertensive patients with nephroptosis, they made pyelograms with the patient in the recumbent and in the erect position and observed the effect of posture on blood pressure, glomerular filtration rate and renal blood flow. They utilized the inulin clearance test of Smith and his colleagues to determine the glomerular filtration rate and the diodrast test of White and Rolf to determine the total flow of renal plasma. In some patients with nephroptosis the erect position caused orthostatic hypertension, which resulted from diminution of the renal blood flow and relative constancy of glomerular infiltration. They noted that when ptosis and torsion were present the erect position caused traction on the pedicle, resulting in elongation, narrowing, compression or constriction of the renal vessels. This interferes with the afferent blood supply of the kidney which leads to the production of renin; renin, in turn, constricts the vasa efferentia of both kidneys, resulting in ischemia due to decrease of the total blood flow. The glomerular filtration rate remains relatively constant because of the compensatory effect of increased intraglomerular pressure. The authors made these deductions from detailed studies of 5 cases of orthostatic hypertension due to nephroptosis. Nephropexy was carried out in 1 case¹ advanced mal- though the elevated, it after the u

No systematic determination was made of the proportion of normal fowls resistant to this tumour. Some birds previously negative were re-inoculated with success, so that the earlier failure was attributable to a temporary resistance or, more likely, to poor quality of the inoculum. A few observations, already mentioned, indicated that the tumours did not induce concomitant immunity.

HISTOLOGY OF THE TRANSPLANTED TUMOURS

Individual tumour cells retained throughout the characteristics of those of the primary growth. Variations, probably attributable to mechanical causes, were infrequent. Usually the pattern of the original growth was not retained, though it was found in tumours of the first transplanted generation, where it was reproduced exactly in some metastatic growths in lung, liver and peritoneum and somewhat less exactly in the corresponding primary tumours in the pectoral muscle. In the second generation the original pattern was nowhere exactly reproduced, the closest approximation being in a pulmonary deposit, and in subsequent generations it was recognisable only with difficulty or in small areas.

Before discussing the gross irregularities which were found, especially in early generations, it is convenient to describe a structure which was common throughout the series and which was dominant in one line of transmission from the fifth generation onwards. With low magnification (fig. 6) this feature was the subdivision of the growth into lobules within which the epithelial parenchyma was broken up into columns often disposed radially, so that there was a resemblance to liver lobules with dilated but empty capillaries. The lobules were separated by bands of connective tissue of varying breadth which often contained cartilage or bone. As a rule the connective tissue was delicate and appeared oedematous or myxomatous. The lobules were poorly vascularised and central necrosis was almost constant and often extensive. At the periphery there was usually a zone of compact epithelial tissue of variable depth, and in this zone the structure of the original tumour was best reproduced (fig. 7). Towards the centre, the parenchyma was broken up into columns. In the field illustrated in fig. 7 the columns were separated by a material which was structureless or finely fibrillar, which contained a little debris but few cells and which had no strong preference for hæmatoxylin or acid fuchsin, although it stained selectively with bismarck brown and usually intensely and metachromatically with methyl violet. This was a feature particularly of tumours of short duration and those of rapid growth, and it seemed almost certain that the deposition of the hyaline substance between the epithelial columns preceded the entry of the connective tissue cells which were present

geren Niveau nach Fixierung der Niere in einer höheren Lage.

RÉSUMÉ

1. Dans de nombreux cas l'hypertension essentielle est d'origine rénale.

2. L'examen de tout malade hypertendu devrait comprendre aussi une étude complète du système urinaire.

3. Il faut songer également à la ptose et à la torsion du rein comme facteurs étiologiques de l'hypertension rénale orthostatique.

4. Lors de la recherche étiologique d'une hypertension rénale orthostatique, il est indiqué de mesurer la pression sanguine, aussi bien en état d'activité normale qu'en position couchée, moment auquel elle devrait être abaissée de 30 à 40 mm. Il faut de plus pratiquer des pyélogrammes antéro-postérieur et latéral, en position debout et en position de supination.

5. La ptose et la torsion rénales ne produisent en général pas de symptôme; dans certains cas cependant, la position debout peut créer des troubles de la circulation sanguine, provoqués par la stase due à la pression postérieure ou à la torsion des vaisseaux sanguins rénaux, aboutissant ainsi à une hypertension orthostatique.

6. L'ischémie rénale résultant d'une diminution de la vascularisation sanguine est produite par l'élongation, le rétrécissement, la compression ou la constriction du pédoncule vasculaire.

7. Les malades atteints d'hypertension orthostatique due à la torsion et à la ptose, ont été soulagés par la détorsion et par la néphropexie. Dans quelques cas, bien que

la pression sanguine ne soit pas retournée à la normale, l'hypertension a diminué. Dans d'autres cas, les symptômes cérébraux, oculaires et cardiaques, qui couvrent le tableau de l'affection, ont été améliorés par l'abaissement et la stabilisation de la pression sanguine grâce à une fixation haute du rein.

SUMARIO

1. Em muitos casos a "hipertensão essencial" é de origem renal.

2. Um estudo completo deve ser feito durante o exame clínico do paciente portador de hipertensão.

3. A ptose e a torção renais devem ser incluídas entre as causas etiológicas pois que podem causar hipertensão renal ortostática.

4. Na pesquisa da hipertensão renal ortostática as medidas da pressão arterial devem ser feitas no curso da atividade normal e depois de completo repouso, ocasião em que devem os valores se apresentar com 30 a 40 mm. mais baixos. As pielografias antero-posterior e lateral devem ser realizados com o paciente em decubito e de pé.

5. Em alguns casos a ptose e a torção renais são assintomáticas; pode ocorrer, porém, que a posição erecta determine alterações tensionais porque a estase devida a pressão ou a torção dos vasos renais resulta em hipertensão ortostática.

6. A isquemia renal consequente a diminuição do suprimento sanguíneo é causada pelo estiramento, estreitamento, compressão ou constricção do pedículo vascular.

No systematic determination was made of the proportion of normal fowls resistant to this tumour. Some birds previously negative were reinoculated with success, so that the earlier failure was attributable to a temporary resistance or, more likely, to poor quality of the inoculum. A few observations, already mentioned, indicated that the tumours did not induce concomitant immunity.

HISTOLOGY OF THE TRANSPLANTED TUMOURS

Individual tumour cells retained throughout the characteristics of those of the primary growth. Variations, probably attributable to mechanical causes, were infrequent. Usually the pattern of the original growth was not retained, though it was found in tumours of the first transplanted generation, where it was reproduced exactly in some metastatic growths in lung, liver and peritoneum and somewhat less exactly in the corresponding primary tumours in the pectoral muscle. In the second generation the original pattern was nowhere exactly reproduced, the closest approximation being in a pulmonary deposit, and in subsequent generations it was recognisable only with difficulty or in small areas.

Before discussing the gross irregularities which were found, especially in early generations, it is convenient to describe a structure which was common throughout the series and which was dominant in one line of transmission from the fifth generation onwards. With low magnification (fig 6) this feature was the subdivision of the growth into lobules within which the epithelial parenchyma was broken up into columns often disposed radially, so that there was a resemblance to liver lobules with dilated but empty capillaries. The lobules were separated by bands of connective tissue of varying breadth which often contained cartilage or bone. As a rule the connective tissue was delicate and appeared oedematous or myxomatous. The lobules were poorly vascularised and central necrosis was almost constant and often extensive. At the periphery there was usually a zone of compact epithelial tissue of variable depth, and in this zone the structure of the original tumour was best reproduced (fig 7). Towards the centre, the parenchyma was broken up into columns. In the field illustrated in fig 7 the columns were separated by a material which was structureless or finely fibrillar, which contained a little debris but few cells and which had no strong preference for hæmatoxylin or acid fuchsin, although it stained selectively with bismarck brown and usually intensely and metachromatically with methyl violet. This was a feature particularly of tumours of short duration and those of rapid growth, and it seemed almost certain that the deposition of the hyaline substance between the epithelial columns preceded the entry of the connective tissue cells which were present

gical hematomas both in the anterior and in the posterior fossa. Nevertheless, many a patient with cerebral concussion, an injury less dramatic than many others and carrying little or no threat to life is neglected by the general practitioner and the specialist alike. As a result, many a patient in whose case only the diagnosis of cerebral concussion has been made remains incapacitated by severe headaches for months or even years.

The purpose of this communication, therefore, is to clarify and evaluate the much maligned symptom complex loosely termed "the postconcussion cerebral syndrome."

A patient with this syndrome, some weeks after injury, may be quite normal as judged by gross neurologic tests; he may have a normal electroencephalogram; roentgenogram of the skull and tests of the spinal fluid may give negative results, and even the pneumoencephalogram may be normal; yet the patient complains of severe headaches and exhaustion, as well as inability to return to his usual duties. In the courts of law such persons are often accused of malingering or of having a "litigation neurosis."²

The symptom complex following many cerebral concussions consists of two major factors: (1) bouts of severe headache or hemicrania, and (2) the syndrome of vasomotor (neurocirculatory) exhaustion.

The headaches, often severe, may begin in the suboccipital area, radiating to the vertex and at times to the area behind one eye. In other cases the pains are frontal and temporal, extending over the vertex to the occipital area.

Analysis of the symptoms of several thousands of such patients will reveal that headaches persisting for months or years after a cerebral concussion are *real* and that they are *extracranial* in origin. The headaches stem primarily from two sources: (1) the upper cervical-spinal

nerve roots and (2) elements of the trigeminal nerve. Alternately, a combination of the two may exist.

Before going into greater detail, I wish to introduce a new term that describes and encompasses the complex of symptoms that follows injuries to the head and neck. My new term is *craniocervical syndrome*.

The Role of Cervical Trauma.—A patient who incurs concussion while riding in a moving vehicle always undergoes some degree of *cervical sprain*, and the vast majority of those with whiplash injuries of the neck have some degree of cerebral concussion³ and, most certainly, sprain of the cervical portion of the spine.

"In almost every instance of head trauma, some of the force is transmitted



Fig. 1.—Cutaneous distribution of C2 and C3. Modified from Mayfield, F. H.: *Neurosurgical Aspects of Cervical Trauma*, Clinical Neurosurgery 2:85, Williams and Wilkins Company, 1955.

structure between the two strains which may not be permanent variants

The formation of cartilage and bone

Bone or cartilage was found in tumours of the first and second generations which had grown for 224-334 days, but not in the few tumours of the third and fourth generations, none of which, however, survived more than 47 days. In the three generations which followed, bone formation was almost constant. It was present in the single tumour of the fifth generation, in all four tumours of generation 6A and in five of the seven tumours of 7B. Bone was found in relatively young tumours, for example, after 35, 49, 60, 66 and 86 days. From the eighth generation onwards bone was uncommon. In the series 8C (illustrated in fig 2) it was not found in growths of 50, 75, 81 and 84 days' duration, but was present in the slowest growth, which survived 125 days. No bone was found in the series 9A, which included growths of 84 and 97 days' duration, and so far all tumours of the fast-growing strain have been free from bone.

Frequently, and especially in the early generations, bone formation was most active near the sternum, but the contiguity of pre existing bone was certainly not indispensable, for bone was present in the centre of an autoplast which was completely enclosed in the belly of a wing muscle (fig 15). Bone was also present in large amount in a breast tumour separated from the thoracic wall by an intact M pectoralis minor. Moreover it was usual for bone to be scattered throughout the growths. The frequency and extent of the formation of cartilage and bone was in strong contrast with the rarity of fibrosis. Scurrhous areas were found only occasionally and no tumour was scirrhus throughout. Moreover, when in later generations and in the rapidly growing tumours the stroma was more frequently composed of mature fibrous tissue, bone formation was unusual. There was therefore an inverse relationship between the development of fibrous tissue and of bone. The conclusion to which these several observations led was that bone or cartilage was formed by connective tissue cells which under other circumstances produced fibrous tissue.

Necrotic tissue was usually present and was most extensive in growths of long standing. Some bone appeared to have originated therein, but evidence of a preceding deposition of calcium salts, such as commonly occurs when heterotopic bone is laid down in necrotic tissues, was not observed.

The formation of bone was followed in greater detail in two other situations. The first was the connective tissue which divided the parenchyma into lobules in areas where this tissue was delicate and the seat, apparently, of oedema or myxoid change (fig 17). By

When the innervation of the scalp is disturbed by contusion, sensory changes will be discovered if careful testing is done. In the management of intractable severe occipital headache, Mayfield and others have observed that section, primarily of the second cervical sensory root intradurally, or of the second and third, will abolish the pain. Chambers,¹¹ reporting on a series of 35 patients who had undergone posterior rhizotomy of the second and third cervical nerves for occipital pain, stated that in only 1 did the procedure fail to bring relief. Chambers specifically pointed out that a psychoneurotic attitude, acquired after years of pain, on the part of the patient is not a valid deterrent to surgical intervention.

The Vasomotor Exhaustion Syndrome.

—It is my conviction that the incapacitating symptoms, consisting of high-headedness, giddiness, exhaustion, insomnia and a feeling of insecurity, during periods of paroxysmal tachycardia, are all due to the stress reaction. This is often noted in patients with minor injuries, even, as a rule, when there has been no unconsciousness. This group of symptoms is caused by a fright reaction brought on by the conscious experience of a near catastrophe. This reaction is related to the stress or alarm reaction followed by the exhaustion syndrome as originally described by Selye.¹² It is best illustrated and contrasted by two types of injury: (1) severe trauma with a prolonged period of unconsciousness, and (2) a narrow escape from catastrophe.

In the first instance, the severely injured patient who is unconscious for a prolonged period and does not even remember the accident makes a prompt and complete recovery, while the patient who has had a narrow escape shows all the manifestations of the stress reaction produced by the shock of watching the oncoming catastrophe with a sense of complete helplessness.

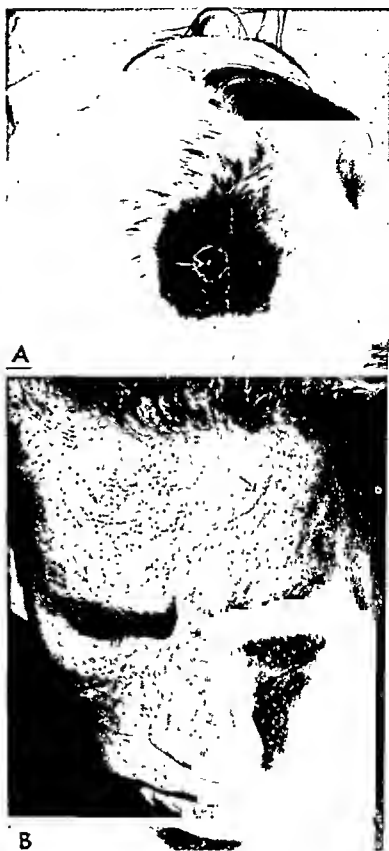


Fig. 4.—A, minute scar following local scalp contusion that produced attacks of left hemicrania, with pain behind left eye. B, healed scar involving twigs of left supraorbital nerve. Patient has periodic attacks of migraine-like headache.

SUMMARY

The author discusses accidental injuries to the head, together with the post-concussion syndrome. He points out that in the

PLATE III

- FIG 10 —Edge of tumour, with muscle (pink) at lower border. Imperfect columns of carcinoma cells at this edge with connective tissue cells between. Above, isolated cells in the matrix which stains with bismarck brown and many spaces containing degenerating cells or debris. [MH28/3C—47 days]
- FIG 11 —A long standing tumour [MH28/5B—192 days]. Bone (red) is present in the loose connective tissue stroma at the right hand margin and within the tumour lobules. The lower mass of intralobular bone is shown to be continuous with the stroma. In the lower left hand corner the gradual transition from bismarck brown to fuchsin staining can be seen.
- FIG 12 —Rapidly growing tumour [MH28/8D—21 days]. Part of a lobule imperfectly outlined by fibrous tissue which does not penetrate into the parenchyma.
- FIG 13 —Higher magnification of another area of the tumour illustrated in fig 12. The matrix, staining with bismarck brown, separates the columns of parenchyma and is present also in irregular spaces enclosed by the epithelial cells.

2. *Examinations of the Visual Field.*—These enable the examiner to detect defects in the field.

3. *Spinal Puncture.*—Spinal puncture is valuable for the determination of cell counts, the question of organisms, the Kahn test, and Lange colloidal gold test when indicated. An increase in protein is likely to be present. Spinal puncture should be discouraged in the presence of choked discs, since herniation of the brain through the tentorial notch or the foramen magnum may result in death.

4. *Pneumoencephalographic and Pneumoventriculographic Studies.*—Displacement, deformity, distortion or dilatation of the ventricles or the subarachnoid spaces can be detected by these means, which helps one to recognize the presence of an expanding lesion, hydrocephalus or cortical atrophy.

5. *Electroencephalographic Studies.*—Disturbance of the normal brain waves by a neoplasm or the presence of focal abnormalities, especially a delta focus, may be detected in the electroencephalogram.

6. *Angiographic and Arteriographic Studies.*—By these means one can outline a neoplasm. They are extremely useful in distinguishing lesions within and about the brain, especially lesions of cerebral vessels.

7. *Dye Studies in Combination with the Isotopes.*—As a diagnostic procedure, isotopes in conjunction with dye injected intravenously have a tendency to concentrate in an intracranial neoplasm (cysts excepted), making it possible to detect and localize a brain tumor by use of the Geiger counter.

Circumscribed benign and encapsulated tumors of the intracranial cavity are relatively easy to remove. Gliomas are the invasive types in the brain and should be regarded as malignant. Of this group, the medulloblastoma presents the most diffi-

cult problem. Glioblastoma multiforme may come on with precipitous suddenness and seems to originate most commonly in the white matter. Medulloblastoma and glioblastoma metastasize. In my own experience the only tumor of the brain that has shown definite evidence of metastasis is the medulloblastoma; several years ago, however, while in Vienna, I saw 2 patients with glioblastomas that showed evidence of metastasis.

Another group of malignant tumors of the brain is composed of the metastatic growths. Recurrent glioma of the brain, glioblastoma or spongioblastoma seldom metastasizes. The method of handling the latter group of neoplasms depends to a great extent on their location. Block dissection with total removal is the minimum operation to be considered. Lobectomy and, in some instances, total removal of the cerebral hemisphere is indicated and has proved effective.

For the glial group of tumors, medulloblastoma excepted, irradiation has proved disappointing, and in some instances the clinical progress would suggest that it accelerated the growth of the neoplasm. Irradiation after block dissection when recurrence has become evident has practically no effect on the lesion, not even in the relief of pain. I no longer advise or suggest irradiation therapy for the glioma group—medulloblastomas excepted—and I note that my results compare favorably with those of irradiation for the glioma type of tumor.

The various growths encountered, which include dermoid tumor, teratoma epidermoid tumor (cholesteatomas), chordoma and craniopharyngioma, are usually congenital. Meningioma, neuroma, angioma and hemangioblastoma are usually of mesodermal origin.

The pituitary tumors are usually mixed, but are distinguished as the chromophobe and the chromophil type.

thing but solved. Approximately 50 per cent of all deaths after operation for brain tumor in this clinic were due to acute edema of the lungs. The treatment of this complication has shown practically no improvement until recently. Since the introduction of antibiotics and sulfa drugs the incidence of terminal pneumonia has been greatly reduced, and in the past eight years death due to terminal pneumonia has been practically nil. Aspiration pneumonia occurred most frequently during World War II, primarily because of inexperienced and inefficient personnel. Edema of the pons occurred primarily in pontine lesions when a heroic effort was made to remove them. The incidence of unrecognized postoperative hemorrhage, fortunately, is very low—2 per cent. Careful postoperative follow-up observations should eliminate this entirely. Under "surgical shock" are listed deaths that occurred on the operating table. Anesthesia had no influence.

It is quite evident from these statistics that, if adequate satisfactory treatment can be instituted to counteract acute edema of the lungs, the operative mortality rate would drop 50 per cent.

It is fair to assume, therefore, that fluid and electrolytic balance in the immediate postoperative period is of the utmost importance. For the past fifteen years potassium, sodium and chloride evaluations have been made preoperatively, and the proper balance becomes increasingly important as the age of the patient increases. Evidence shows that the immediate postoperative time is a period of disturbed renal function. During the operation, and for about twelve hours thereafter, intravenous injections should be limited mostly to the replacement of lost blood, plus a sufficient quantity of 5 per cent dextrose in water to cover insensible losses. Saline solution, unless the blood chloride level is low, should be dispensed with. The neces-

sity of maintaining postoperative fluid and electrolytic balance cannot be too strongly emphasized. The total fluid intake for the first three or four days should seldom be more than 3,000 cc. in twenty-four hours. Dextrose in water should be relied upon. One hundred Gm. of dextrose is sufficient to prevent ketosis. Some authors recommend withholding salt solution until after the fifth postoperative day. Others recommend a simple electrolytic combination of sodium, potassium and chloride in a 10 per cent solution of dextrose in water, or a 10 per cent amino acid mixture.

Evaluating and maintaining the fluid and electrolytic balance postoperatively should be most helpful in reducing operative mortality and complications, particularly edema of the brain and lungs.

The incidence of death from glioblastoma multiforme (Table 2) increased from 1936 through 1945, during which period extreme radical attacks were carried out on this type of tumor. Many multiple lobectomies and hemispherectomies were done. Of the deaths, 8 followed hemispherectomy. Justification for this type of radical operation, in my opinion, can be substantiated in that the survival of patients hemispherectomized and lobectomized for glioblastoma has ranged from two to eleven and one-half years.

The incidence of death from medulloblastomas has gradually decreased, in spite of radical removal followed by heavy irradiation. The survival period has ranged from two years to seventeen years and four months, which in my opinion justifies the additional risk of the primary operation. For single metastatic tumors of the brain I definitely advise removal. The survival period here has been as long as three and one-half years.

Table 3 contains a more detailed account of the cause of death from the various types of lesion, and the natural conclusion, which I wish again to emphasize, is the



Fig. 2.—*A*, technic. Patient on Albee fracture table. Injured arm secured to traction bar by means of muslin bandage loops from olecranon bone pin to footpiece in upper extremity position. Shoulder abducted to 90 degrees and elbow flexed to 80 degrees, with hand suspended from overhead crossbar. Note accessibility of lesion to roentgen study. See text for details of manipulation. *B*, efficient countertraction to the opposite arm, stabilizing the injured shoulder joint and permitting reduction of the fracture-dislocation. Opposite shoulder in full abduction—tied to traction bar with elbow extended. Bar must be tied to wall fixture to maintain fixed position when extreme traction is applied during reduction. See text.

and the fingers suspended to an overhead bar with the elbow in not more than 80 degrees of flexion. A 5/32 inch Steinman pin is drilled through the olecranon and connected to the traction bar by means of a separate loop of heavy muslin bandage over each protruding end of the pin. Both loops must be kept close to the point of emergence of the pin through the skin and crisscrossed or tied together close to the elbow before being tied to the traction bar. Failure to do this will result in bending of



Fig. 3.—*A*, anterior view showing traction and countertraction. Overcorrection of shortening at fracture site removes bony obstacles to reduction of the humeral head. *B*, patient ambulatory in splint cast twenty-four hours after reduction. Fixed traction maintained between olecranon bone pin and thoracic wall, which must be heavily padded. See text for management of convalescence.



Fig. 4.—*A*, patient J. B., aged 61, a golf caddy. End result eight months after treatment for fracture-dislocation of left shoulder by fixed traction method. Complete rehabilitation with asymptomatic shoulder. *B*, minimal muscle atrophy and restriction of internal rotation.



Fig. 6.—*A*, patient J. P., injured Sept. 15, 1952, in central Florida, when he swerved his car to avoid a wheel which had broken loose from a truck-trailer coming from the opposite direction. The car struck a pole and he sustained a fracture-dislocation of the left shoulder and a fracture of the femur. He was brought to Miami ten days later and, in view of the delay, I elected to do an open reduction. This case is shown to demonstrate the advantage of applying fixed traction during the course of operation. *B*, open reduction performed with upper extremity attached to traction bar by means of an olecranon pin. Minimal fixation devices were utilized to restore position of fracture at shoulder joint. Three and a half years later, calcification of the capsule is evident, as well as inferior subluxation. Abduction is limited at 80 degrees, with mild limitation of internal and external rotation. Patient works full time as a waiter in a local restaurant.

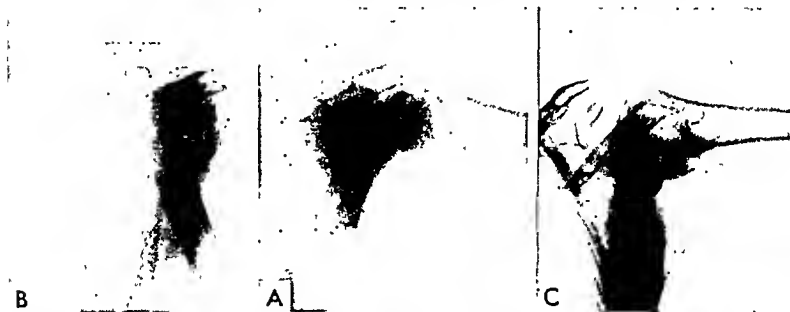


Fig. 7.—*B*, patient M. M., aged 51, injured June 21, 1953, in a motor accident, shows a comminuted fracture through surgical neck of humerus with anterior and rotational dislocation of the humeral head. Several fractural lines extend into humeral head but there is only minimal displacement of the greater tuberosity. *A*, film taken in operating room. Immediate reduction was done by fixed traction method. Head of humerus is derotated and in satisfactory alignment. *C*, end result three years later. Complete restoration of circulation through humeral head. No evidence of aseptic necrosis. Full range of painless motion regained.

have not been comparable to those obtained with other skeletal injuries. I attribute this to the difficulties encountered in the application of traction to the upper extremity, which are so considerable that the maximum pull available has not been employed. Although methods of obtaining

fixed skeletal traction have been described, they fall short in not providing for countertraction that will not only make full reduction possible but permit the reduced position to be maintained during convalescence.

Adequate reduction and fixation should

It is well known that the adaptation of a tumour to growth in new hosts may be slow and difficult. In the present instance there was an initial period of difficult transmission, characterised by a progressive distortion of the histological pattern whereby the original structure became scarcely recognisable. This period was terminated at the sixth passage by an abrupt improvement in the results of transplantation. Concurrently, the histological picture became more stable, though it still differed in many particulars from that of the primary tumour. There was another abrupt but less dramatic change in the seventh passage which resulted in a line of tumours of rapid growth. These reproduced the original histological structure more exactly than any tumours since those of the earliest passages. These growths of the later generations demonstrated beyond reasonable doubt that the transplanted tumours were lineal descendants of the original carcinoma, and further, that the manifestation of the distinctive histological structure was correlated with the habit of growth.

The outstanding anomaly in the transplanted tumours was the presence of cartilage or bone, which occurred frequently, often in large amount, and often in close relation to healthy epithelial cells. Many of the growths could be described as *mixed tumours*. Indeed, they resembled closely the mixed tumours of the salivary glands of man. The characteristic intercellular material, a constant feature of the transplanted tumours, was similar to if not identical with that described under various terms in the human tumour where, according to the general view, it is a product of the epithelial cells (Masson and Peyron, 1914, Masson, 1922, 1924, 1927-28, Leroux and Leroux-Robert, 1934). In the transplanted tumours its most constant property was an affinity for brown. The formation of cartilage in the human tumour is described in terms which apply almost without modification to that in the fowl carcinoma. Two processes are concerned in man and are observed also in the fowl carcinoma: the first the formation of true cartilage by connective tissue cells; the second the development of a cartilage-like structure by the flattening and modification of epithelial cells in a process of squamous metaplasia. Masson describes this as a transition into cartilaginous tissue, while Fry and Leroux, on similar data, take the view, which I have confirmed by examination of the fowl carcinoma, that the cartilage and the imprisoned cells remain distinct. The characteristic matrix is evidently a factor in the production of a "mixed" structure, but not a specific secretion of a single type of material. The outstanding features of the carcinoma are attributed to specific properties of the cells.

and the social service worker report their impressions of the child's problem, and a group decision as to the best course of therapy is reached. This may be preprosthetic physical therapy or other treatment.

If the patient is judged ready for a prosthesis, it is prescribed. After its fabrication the device is checked for fit and function, and training in its use is provided. The child returns to the amputation conference at intervals of three to six months for review of his progress. If repair or a replacement of the prosthesis is necessary, it is ordered. If further training, psychologic help or other therapy is indicated, this is prescribed.

The children examined by the UCLA group have presented all manner of deformities. In some the loss may be as little as one or more digits. The foot or hand may be functional, or it may be deformed and have little or no function. The site of amputation may be at any level. The deformity may be a malformation of the extremity rather than an amputation. Since treatment varies according to the type of deformity as well as the age of the patient, we have arbitrarily divided the deformities into two categories, complicated and uncomplicated. If the anatomic and functional status of the extremity proximal to the level of amputation or deformity is normal, or nearly so, the deformity is classified as uncomplicated (Birch-Jensen exogenous group)⁴. Surgical intervention here is rarely indicated except to ablate functionless vestigial digits, which may be cosmetically offensive or may interfere with the function of the prosthesis. Traumatic amputations are included in this group, since the fitting problems are similar. Present prosthesis knowledge permits the fitting of functional artificial limbs at any level above the carpal and tarsal areas. There are no "sites of election" in the upper extremity. All possible length should be preserved.⁵ Fitting and fabri-

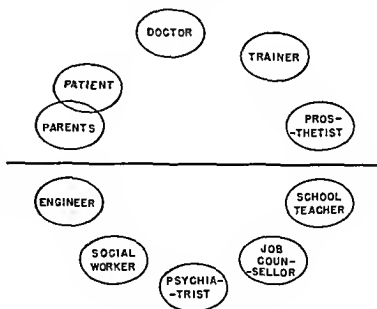
cation in these cases is usually not difficult. Acceptance of the device and training in its use may offer more serious problems. The services of a psychiatrist, a trainer, a social service worker and a teacher may be necessary.

In some instances phocomelia and some other types of deformity are rather grotesque, with ill-formed and distorted terminal segments. These are frequently accompanied by dysplasia of the hip or shoulder joints, short femurs or humeri, limited function of the knee or elbow and divers muscular anomalies. Such deformities we have designated complicated (Birch-Jensen endogenous group).⁴ Fitting is more difficult. Impaired function of the extremity invariably makes control and use of the artificial limb a greater challenge to the prosthetic team than the uncomplicated deformity. Our ability to help these people is limited. Further study and investigation of their problems is necessary.

Surgical intervention for complicated deformities is most frequently indicated

THE PROSTHETIC TEAM

ESSENTIAL MEMBERS



DESIRABLE ADDITIONAL PERSONNEL

It is well known that the adaptation of a tumour to growth in new hosts may be slow and difficult. In the present instance there was an initial period of difficult transmission, characterised by a progressive distortion of the histological pattern whereby the original structure became scarcely recognisable. This period was terminated at the sixth passage by an abrupt improvement in the results of transplantation. Concurrently, the histological picture became more stable, though it still differed in many particulars from that of the primary tumour. There was another abrupt but less dramatic change in the seventh passage which resulted in a line of tumours of rapid growth. These reproduced the original histological structure more exactly than any tumours since those of the earliest passages. These growths of the later generations demonstrated beyond reasonable doubt that the transplanted tumours were lineal descendants of the original carcinoma, and further, that the manifestation of the distinctive histological structure was correlated with the habit of growth.

The outstanding anomaly in the transplanted tumours was the presence of cartilage or bone, which occurred frequently, often in large amount, and often in close relation to healthy epithelial cells. Many of the growths could be described as *mixed tumours*. Indeed, they resembled closely the mixed tumours of the salivary glands of man. The characteristic intercellular material, a constant feature of the transplanted tumours, was similar to if not identical with that described under various terms in the human tumours, where, according to the general view, it is a product of the epithelial cells (Masson and Peyron, 1914, Masson, 1922, 1924, Fry, 1927-28, Leroux and Leroux-Robert, 1934). In the present tumours its most constant property was an affinity for bismarck brown. The formation of cartilage in the human tumours is described in terms which apply almost without modification to that in the fowl carcinoma. Two processes are distinguished in man and are observed also in the fowl carcinoma. The first is the formation of true cartilage by connective tissue cells of the stroma, the second the development of a cartilage-like tissue by imprisonment and modification of epithelial cells in a matrix of their own production. Masson describes this as a transformation of epithelial into cartilaginous tissue, while Fry and Leroux and Leroux-Robert, on similar data, take the view, which I am led to adopt by examination of the fowl carcinoma, that the tissue is pseudo-cartilage and the imprisoned cells remain epithelial. Hence the characteristic matrix is evidently a factor of prime importance in the production of a "mixed" structure, but equally evidently is not a specific secretion of a single type of epithelium. Some of the outstanding features of the carcinoma cannot therefore be attributed to specific properties of the cells of the oviduct whence



Fig. 3.—Above, roentgenograms showing (left to right) right upper extremity with single, short forearm bone and single vestigial finger; left upper extremity with webbing of index and middle fingers, and bifid right femur and knee disarticulation. Below (left to right), photographs showing short right below elbow, and knee disarticulation stumps: pylon type right lower prosthesis and short below elbow device with infant passive hand; articulated right artificial leg and actively controlled hook.

die fingers, four metacarpals, from the second of which two fingers arose, an undeveloped thumb that functioned as a unit with the index finger and, on the left, a short malarticulated bifid humerus with a small hand-shaped functionless appendage distal to it, was seen

in March 1955 (Fig. 5, A and B). He was provided with a modified prosthesis for use above the elbow, which was fixed at 135 degrees and a 10x hook for the left side (Fig. 5C). His neuromuscular development was insufficient to permit a satisfactory hook opera-

In transplanted tumours the parenchyma cells survive from generation to generation, but the stroma is formed anew by each host, and its amount and quality are determined in part by idiosyncracies of the host, in part and mainly by the implanted parenchyma cells which habitually evoke a stroma of characteristic kind. Bashford, Murray and Cramer (1905) described this as "the specific stroma reaction" of tumours. Thus, the epithelial tumour cells of this fowl carcinoma habitually over a considerable period evoked a stroma which was characteristic in appearance and especially prone to the formation of cartilage or bone.

A "mixed" structure may be produced in a mesoblastic tumour by the hyperplasia and metaplasia of invaded epithelial tissue as described in filterable tumours of fowls (Foulds, 1934a), where again it was concluded that there was but one neoplastic component. In discussing mixed tumours of man, Leriche and Policard (1926) say (p. 185) "il nous semble qu'il serait plus légitime de considérer que l'os et le cartilage trouvé dans ces tumeurs ne sont que des métaplasies toujours possibles dans un tissu conjonctif en évolution. Du coup, l'origine de ces tumeurs se simplifie. Si l'on tient compte de la fréquence des zones de nécrose dans ces néoplasies, on n'est pas étonné qu'il puisse y avoir des points calcifiés, et ceux-ci sont probablement à l'origine des plaques ossiformes qu'on y trouve." This explanation, reasonable when applied to the bone which can occasionally be found in almost any kind of tumour, is an over-simplification of the problem of the constant association of cartilage or bone and epithelial tissue in well-defined clinical groups of new growths. In these and in the carcinoma of the fowl it is more likely that the activities of epithelial tumour cells of particular kinds regularly constrain connective tissue cells to form cartilage or bone. Some evidence of a different kind in favour of this view is supplied by the experiments of Huggins (1931). He found that implants of urinary epithelium into the muscle in rabbits regularly gave rise to bone formation, while other epithelial tissues did not.

The other variants of histological structure have not been analysed in detail. So far attention has been focussed on the directive action of the parenchyma upon the stroma, but there is a reciprocal action of the stroma which, through nutritional and mechanical influences, causes a varying development and arrangement of the parenchyma. The filterable tumours of fowls may have an unfamiliar structure impressed upon them by the tissues in which they grow (Foulds, 1934a), and even a normal tissue such as the thymus gland can manifest unsuspected capacities for differentiation when transferred to a new environment (Foulds, 1934b). There is a further complication in the carcinoma since the adaptation to growth in new hosts indicates transmissible changes in the parenchyma cells. The structure as well as the

functional prostheses at any level of loss. Suction socket wearing in the fourth year is generally feasible. We know of 1 instance of successful fitting at the age of 15 months. Absence of a portion of the upper extremity, particularly distal to the elbow, is compensated for by the congenital amputee to a remarkable extent. He must be convinced that improved function will outweigh the inconvenience of wearing a prosthesis (Cases 6 and 7). We do not prescribe functionless hands on a cosmetic basis.

Decision as to the optimum time for fitting the child and the type of apparatus prescribed are based on several factors: (1) the level and nature of the amputation; (2) the age of the patient, and (3) the attitude of the child and his parents toward the wearing of prostheses.

The level and nature of amputation determine to a considerable extent the type of prosthesis prescribed.⁵ The prescription

must be modified according to the patient's age. Neuromuscular development of the infant permits only gross motions.

A child begins standing and walking at about the end of its first year. He should be given something to stand on. Initially this may be a jointless pylon (Case 3). When good balance is attained an ankle can be added, and at about the age of 3 he can probably operate a knee joint.

As to the upper extremity, a child under a year of age can push and pull only, so the infant passive hand is used (Cases 3 and 5). The mother can pre-set a passive elbow (Case 1). At the age of approximately 2½ years the child will have developed sufficiently to operate a small hook. Two-handed activities away from the body are thus provided. Not until he approaches the age of 4 is the child able to understand the mechanics of a fully functioning prosthesis and to make active use of it.

Training.—As yet there is no unanimity



Fig. 7.—A, very short-below-elbow amputation on right. B, prosthesis with hook. C, prosthesis with adult functional hand, which is larger than patient's normal hand.

- | | | |
|---------------------------|------|--|
| MALLORY, F B | 1914 | The principles of pathologic histology,
<i>Philadelphia and London</i> |
| MASSON, P | 1922 | <i>Bull Ass franç Cancer</i> , vi 345 |
| " | 1924 | Atlas du Cancer (Association française
pour l'étude du Cancer), 3rd and
4th fascicules |
| MASSON, P , AND PEYRON, A | 1914 | <i>Bull Ass franç Cancer</i> , vii 219 |

Solitary Cyst of the Os Calcis in Adults and Children

Report of Eight Cases

LLOYD B. KINGSBERY, M.D., F.I.C.S., D.A.B.

LA LIMA, HONOURAS, CENTRAL AMERICA

THIS lesion of bone is usually detected incidentally after roentgenograms have been taken for signs and symptoms referable to other parts of the foot or to the ankle. In a small percentage of cases symptoms of pain in the heel on weight bearing and mild tenderness in the same area may lead one to suspect solitary cyst.

Incidence.—According to the literature the average age of the patient at the time of occurrence or of diagnosis is approximately 15 years. The lesion is somewhat more common in the male than in the female, although in 4 of the cases here reported the patients were 9 years of age or younger, and the sex distribution was equal among these.

In 1877 Virchow first described solitary bone cyst in a tubular bone, but not of the os calcis. In 1931 J. R. Moore listed 32 cases of tumor of the os calcis at Johns Hopkins Hospital but observed no bone cysts in these. He noted mention of 4 such cysts in the literature of the previous fifty-one years.

Of 1,740 bone tumors listed at the Johns Hopkins Hospital in 1931, 2 per cent involved the os calcis.

In 1932, Coley and Sharp stated that benign bone cyst in the os calcis is exceedingly rare.

N. R. Smith reported 1 case of solitary

cyst of the os calcis in 1930; Sobel and Beclere, 1 case each in 1936, and Fitté and Mulcahy, 4 unproved (?) cases in 1939. In 1943, McLaughlin described 1 case in a series of 26 cases involving various bones. Copleman, Vidoli and Crimmings reported 3 cases in 1946, in 2 of which surgical treatment was employed. Janes reported 1 case in 1946 and Verstandig 1 case in 1947.

In 1950, Meyerding and Jackson reported 1 case of a lesion diagnosed as giant cell tumor, though with a picture similar to that of solitary or unicameral cyst. They noted that the lesion probably corresponded to the unicameral cysts of the os calcis reported by others (Copleman; Vidoli and Crimmings; Janes; Dunn; Jaffe and Lichtenstein).

Stewart and Howel in 1950 reported a series of 46 solitary bone cysts or "regressive osteoclastomas," 4 of which were in the os calcis. The average age of the patients was 15 years. About 65 per cent were male.

Etiologic Theories.—To my knowledge, no final agreement has been reached as to the cause of these lesions.

Geschicter and Copeland expressed the opinion that solitary bone cyst represents the healing or healed stage of giant cell tumor. Coley and Higinbotham suggested that these cysts probably begin with a sub-cortical hemorrhage followed by localized bone destruction, a zone of vascular granulation tissue in which osteoclasts (giant cells) are present, then fibrosis, and finally cyst formation.

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.
Submitted for publication Sept. 13, 1956.

If in a stained animal local functional ischaemia of a part is produced, *e.g.* by constricting the root of a limb or by the injection of adrenaline, the ischaemic part becomes yellow in colour and is thus strikingly differentiated from the surrounding normal red. The present author has repeated some of Rous's observations, and found that if a single needle prick be made through a drop of adrenaline hydrochloride into the skin of a stained mouse, the resulting zone of exsanguination is clearly distinguishable as a yellow circle. The phenomenon is the more striking in view of the fact that it has been difficult to convince oneself that adrenaline produces any visible external blanching of the skin when injected into unstained mice. The procedure can be controlled by injecting a similar concentration of HCl, or the adrenaline hydrochloride may be neutralised immediately before use. Rous stated that the colour changes should not be regarded as indicating any well-defined pH, but only as an approximate indication of differences in reaction between different parts of the tissues. Excretion of the injected dye, which starts almost immediately, is complete in the course of a few hours, and the staining may be repeated at frequent intervals without apparent harmful effects on the mouse.

Methods

Four per cent phenol red solutions were prepared as described by Rous (1926). The specimens of phenol red (BDH) used in the present investigation required somewhat less alkali than the amount mentioned by Rous. The pH of the solutions used during the experiment was determined by Dr L. P. Kendal by means of the glass electrode, and varied from 7.2 to 7.9, with an average value of 7.5.

The animals used were all white mice, as the colour changes due to vital staining are more readily perceived in these than in coloured mice. The mice were painted in the interscapular region at weekly intervals with tar, 1, 2, 5, 6 dibenzanthracene (saturated solution in benzene) and 1, 2 benzpyrene (1 per cent solution in benzene) for sixteen weeks, thirty weeks and sixteen weeks respectively. The injections of phenol red were made on the day preceding the next painting, *i.e.* six days after the previous application of a carcinogenic agent. This day was chosen because by this time a considerable proportion of the mice had freed themselves from tar so that it did not complicate the picture, and if animals had to be cleaned prior to examination it did not entail any considerable reduction in the total period of exposure to the carcinogen.

0.5 c.c. of the phenol red solution was injected intraperitoneally and an examination was made as soon as staining was complete. All the mice were first examined without further treatment apart from clipping the hair from the part. In many cases the picture could be more sharply defined by lightly smearing cedar wood oil or olive oil on the skin surface, but caution was necessary in examination of the ear, since any remaining tar dissolved in cedar wood oil might be expected to be rubbed off. Such yellow patches, of course, might be expected to be rubbed off. Mice in which the oil had been rubbed off and examined.

The pathologist's diagnosis of biopsy specimens from this cyst was "material from a simple bone cyst." Space does not permit giving the full details of this report. A Gram



Fig. 6 (Case 6).—Roentgenogram (Sept. 22, 1944), showing solitary cyst of right os calcis.



Fig. 8 (Case 7).—A, microscopic section of cyst material, low power ($\times 40$). B, microscopic section of cyst material, high power ($\times 300$).

stain of a smear from this cyst revealed no bacteria.

In February 1945 the patient was discharged to full military duty, and no further complaints of pain in the foot or ankle have been reported to me.

In this case, part of the pain on weight bearing may have been caused by the cyst, although this was not proved and the complaints were probably due primarily to chronic sprain of the ankle.

As to the operation, a better procedure would probably be deeper curettage of the cyst wall and the use of cancellous bone grafts.

CASE 7.—J. P., a 37-year-old white man, was seen by a colleague on Sept. 8, 1941, for pain and tenderness in the plantar area of the right heel, of three months' duration. The pain was worse on arising in the morning and was decreased by wearing shoes. The history revealed pain in both feet after the patient had jumped



Fig. 7 (Case 7).—A, lateral view showing large rarefied area on anterior aspect of right os calcis, probably penetrating anterior aspect of plantar cortex of os calcis. B, roentgenogram taken four and one-half months after operation. Bone graft partially united.

If in a stained animal local functional ischæmia of a part is produced, *eg* by constricting the root of a limb or by the injection of adrenaline, the ischæmic part becomes yellow in colour and is thus strikingly differentiated from the surrounding normal red. The present author has repeated some of Rous's observations, and found that if a single needle prick be made through a drop of adrenaline hydrochloride into the skin of a stained mouse, the resulting zone of exsanguination is clearly distinguishable as a yellow circle. The phenomenon is the more striking in view of the fact that it has been difficult to convince oneself that adrenaline produces any visible external blanching of the skin when injected into unstained mice. The procedure can be controlled by injecting a similar concentration of HCl, or the adrenaline hydrochloride may be neutralised immediately before use. Rous stated that the colour changes should not be regarded as indicating any well-defined pH, but only as an approximate indication of differences in reaction between different parts of the tissues. Excretion of the injected dye, which starts almost immediately, is complete in the course of a few hours, and the staining may be repeated at frequent intervals without apparent harmful effects on the mouse.

Methods

Four per cent phenol red solutions were prepared as described by Rous (1926). The specimens of phenol red (B D H) used in the present investigation required somewhat less alkali than the amount mentioned by Rous. The pH of the solutions used during the experiment was determined by Dr L P Kendal by means of the glass electrode, and varied from 7.2 to 7.9, with an average value of 7.5.

The animals used were all white mice, as the colour changes due to vital staining are more readily perceived in these than in coloured mice. The mice were painted in the interscapular region at weekly intervals with tar, 1, 2, 5, 6 dibenzanthracene (saturated solution in benzene) and 1, 2 benzpyrene (1 per cent solution in benzene) for sixteen weeks, thirty weeks and sixteen weeks respectively. The injections of phenol red were made on the day preceding the next painting, *ie* six days after the previous application of a carcinogenic agent. This day was chosen because by this time a considerable proportion of the mice had freed themselves from tar so that it did not complicate the picture, and if animals had to be cleaned prior to examination it did not entail any considerable reduction in the total period of exposure to the carcinogen.

0.5 c.c. of the phenol red solution was injected intraperitoneally and an examination was made as soon as staining was complete. All the mice were first examined without further treatment apart from clipping the hair from the part. In many cases the picture could be more sharply defined by lightly smearing cedar wood oil or olive oil on the skin surface, but caution was necessary in examination after this procedure, since any remaining tar dissolved in the oil appeared yellow, as might be expected. Such yellow patches, of course, could be enlarged or dissipated by gently rubbing the oiled skin.

Mice in which either colour changes or tumours developed were stained and examined weekly, other mice at intervals of two to four weeks.

Estudios químicos de calcio fósforo y fosfatos alcalinos en sangre en estas series, cuando fueron hechos, dieron resultados esencialmente normales.

La biopsia reveló únicamente quiste simple y sirvió esencialmente para descartar otras lesiones.

BIBLIOGRAPHY

- Adams, C. O., and others: Regional Fibrocystic Disease, Surg., Gynec. & Obst. 71:22-32, 1940.
- Bick, E. M.: Differential Diagnosis of Solitary Cystic Areas in Bone, J. Mount Sinai Hosp. 8: 1225-1231, 1942.
- Coley, B. L., and Sharp, G. S.: Primary Tumors of the Os Calcis: A Study of Thirty-Two Cases with a Review of the Literature, Am. J. Cancer 16:1053-1076, 1932.
- Coley, B. L., and Higinbotham, N. L.: Solitary Bone Cyst, the Localized Form of Osteitis Fibrosa Cystica, Ann. Surg. 99:432-448, 1934.
- Copleman, B.; Verdoli, M. F., and Crimmings, F. J.: Solitary Cyst of the Calcaneus, Radiology 47:142-148, 1946.
- Fett, H. C., and others: Bone Cyst: Regeneration of Bone Following Subperiosteal Resection, Am. J. Surg. 74:886-888, 1947.
- Gibson, C. L.: Operation for Epithelioma of the Heel, Ann. Surg. 43:609, 1906.
- Horwich, I. D.: Infiltrating Squamous Cell Epidermoid Carcinoma Involving the Os Calcis, Am. J. Surg. 55:166-168, 1942.
- Jaffe, H. L., and Lichtenstein, L.: Solitary Unicameral Bone Cyst with Emphasis on Roentgen

Picture, Pathologic Picture and Pathogenesis, Arch. Surg. 44:1004-1025, 1942.

James, A. G., and others: Solitary (Unicameral) Bone Cyst, Arch. Surg. 57:137-147, 1948.

Janes, J. M.: Localized Bone Cyst of the Os Calcis, J. Bone and Joint Surg. 28:182, 1946.

McLaughlin, A. D.: Treatment and Results in Localized Osteitis Fibrosa Cystica (The Solitary Bone Cyst), J. Bone and Joint Surg. 25:777-790, 1943.

Meyerding, H. W., and others: Progress in Orthopedic Surgery for 1949; a Review Prepared by an Editorial Board of the American Academy of Orthopaedic Surgeons, Arch. Surg. 57:871-896, 1948.

Meyerding, H. W., and Jackson, A. E.: Benign Giant-Cell Tumors: A Report of 7 Cases in Which the Bones of the Hands and Feet Were Involved, Surg. Clin. North America 30:1201-1213, 1950.

Miltner, L. J., and Wan, F. E.: Giant-Cell Tumor of the Os Calcis: Report of a Case Treated by Resection and Tendon Transplantation, J. Bone & Joint Surg. 14:406-409, 1932.

Moore, J. R.: Tumors of the Os Calcis, Radiology 16:232-244, 1931.

Pommer, G.: Zur Kenntnis der progressiven Hamatom-und Phlegmasie-veränderungen der Röhrenknochen, Arch. F. orthop. u. Unfall-Chir. 17:17, 1920.

Schreiner, B. F., and Wehr, W. H.: Primary Malignant Tumors of the Foot, Radiology 21:513, 1933.

Stewart, M. J., and Hamel, H. A.: Solitary Bone Cyst, South. M. J. 43:927-936, 1950.

Verstandig, C. C.: Solitary Unicameral Cyst of the Os Calcis: Report of a Case, New England J. Med. 237:21-22, 1947.

Von Mikulicz, J.: Ueber cystische Degeneration der Knochen, Verhandl. d. Gesellsch. deutsch. Naturforsch. u. Aerzte 76:107, 1906.

I please myself with thinking that the method of teaching the art of healing is becoming every day more conformable to what reason and nature require; that the errors introduced by superstition and false philosophy are gradually retreating; and that medical knowledge, as well as all other dependent upon observation and experience, is continually increasing in the world. The present race of physicians are possessed of several most important rules of practice, utterly unknown to the ablest in former ages, not excepting Hippocrates himself, or even Aesculapius.

—Heberden

to resume its normal condition = I should mention that it is possible that the high level of the colour observed in a small proportion of cases may be the most likely explanation would be the presence of local circulation inadequacy, or that it is due to a certain difficulty from the point of view of the present observation. It has been sometimes show yellow areas and in a few cases skin staining of entire mice has been seen. Such phenomena are often cold and usually last shortly after observation. It is not unlikely that the staining in these cases is referable to anhydremia, a condition which Rous and Dunn (1924) have experimentally shown to be capable of producing yellow areas in stained mice. *Tumour hypoxia* with local acid production. This is unlikely for reasons that will appear later. The first parts appeared about the same time and the incidence of the two processes thereafter increased with the passage of time.

TABLE I
Frequency of yellow areas in totally stained mice undergoing treatment with various carcinogenic agents

Tar	Total mice at beginning of experiment	Survived after 15 weeks	Number showing yellow areas at same stage
1 2 5 6-dibenzanthracene	106	61	43 (70 per cent.)
1 2-benzpyrene	60	46	28 (61 per cent.)
	50	32	25 (78 per cent.)

In some animals the yellow areas persisted for some weeks, in others they were more fugitive in character. In a few mice the whole of the tarred skin became orange in colour, in others there was a punctate yellow mottling throughout the painted area and the impression exists that multiple tumours were unusually frequent in such instances. It will be seen (table I) that more than two-thirds of the mice which survived for 15 weeks showed yellow areas at some stage of the experiment. There appeared to be a significant relationship between the colour change and the appearance of tumours. Table II shows that out of 104 tumours obtained, 68 made their first appearance in juxtaposition to yellow areas in the skin, while only 5 tumours (in three animals) were first seen at unrelated sites in animals showing simultaneous yellow foci. The remaining 31 tumours were not associated with yellow changes at the time of their first appearance, but this figure is not surprisingly high when it is remembered that the change is frequently of an evanescent nature and it may well be

Segmentary pulmonary resection, whether wedge-shaped or atypical, was performed in 52 cases. The open edges resulting from the partial pulmonary resection were brought together by interrupted stitches of absorbable material.

Lobectomy was performed in 43 cases and pneumonectomy in 6.

In the series of *noninfected cysts*, lobectomy or pneumonectomy was reserved for multiple cysts or for cysts occupying an entire lobe or lung.

Marsupialization was preferred for

large cysts, particularly those located in the inferior lobes.

Only 1 death was registered among the 148 cases of noninfected cysts, but in this case the condition was bilateral.

In the series of *infected cysts*, differentiation should be made between cases in which intrabronchial rupture had occurred and those in which intrapleural communication was present. The latter type was associated with extremely serious complications that urgently require pleural drainage. In the last case a pulmonary decorti-

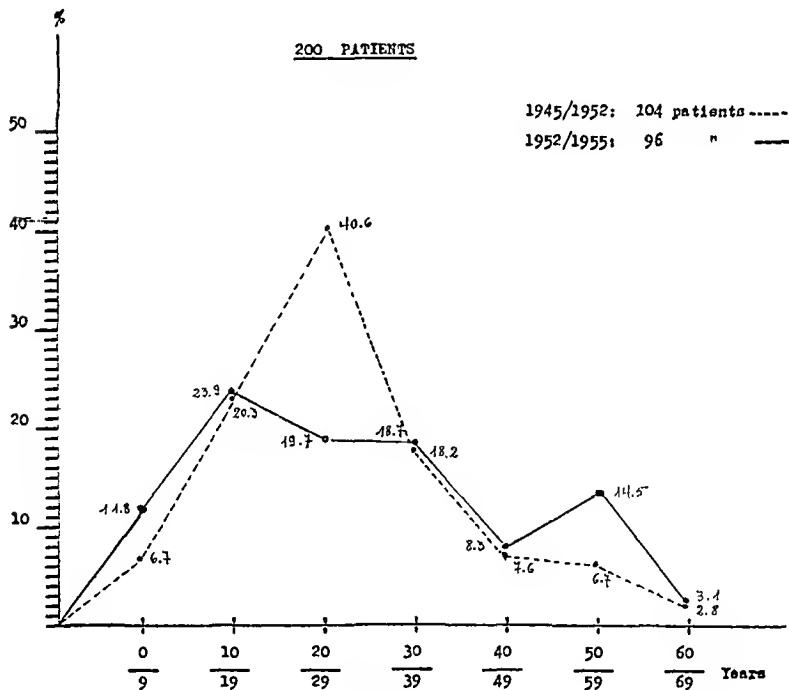


Fig. 1 (see text).

to resume its normal condition 4 *Reduced concentration of dye* It is possible that this might have an effect on the colour displayed in a small proportion of cases, but if so the most likely explanation would be the presence of local circulatory inadequacy, so that this is not a serious difficulty from the point of view of the present observations 5 *Sick mice* may sometimes show yellow areas and in a few cases acid staining of entire mice has been seen Such phenomena offer little difficulty, however, as the animal is obviously abnormal, often cold, and usually dies shortly afterwards It is not unlikely that the staining in these cases is referable to anhydræmia, a condition which Rous and Drury (1929) have experimentally shown to be capable of producing yellow areas in stained mice 6 *Tumour glycolysis with lactic acid production* This is unlikely for reasons that will appear later

The first warts appeared about the same time and the incidence of the two processes thereafter increased with the passage of time

TABLE I

Frequency of yellow areas in vitally stained mice undergoing treatment with various carcinogenic agents

	Total mice at beginning of experiment	Survivors after 15 weeks	Number showing yellow areas at some stage
Tar	106	61	43 (70 per cent)
1 2 5 6 dibenzanthracene	60	46	28 (61 per cent)
1 2 benzpyrene	50	32	25 (78 per cent)

In some animals the yellow areas persisted for some weeks, in others they were more fugitive in character In a few mice the whole of the tarred skin became orange in colour, in others there was a punctate yellow mottling throughout the painted area and the impression exists that multiple tumours were unusually frequent in such instances It will be seen (table I) that more than two-thirds of the mice which survived for 15 weeks showed yellow areas at some stage of the experiment There appeared to be a significant relationship between the colour change and the appearance of tumours Table II shows that out of 104 tumours obtained, 68 made their first appearance in juxtaposition to yellow areas in the skin, while only 5 tumours (in three animals) were first seen at unrelated sites in animals showing simultaneous yellow foci The remaining 31 tumours were not associated with yellow changes at the time of their first appearance, but this figure is not surprisingly high when it is remembered that the change is frequently of an evanescent nature and it may well be

The authors analyze the experience obtained at the Institute of Thoracic Surgery (Buenos Aires) in the treatment of 200 cases of hydatid cyst, in which 93 pulmonary resections, 81 marsupializations, 45 Posadas operations and 5 other procedures were done, according to the pathologic configuration of the cysts and conditions of the lungs.

The importance of pneumonitis and bronchiectasis secondary to chronic infected cysts is pointed out.

RESUMEN

Un breve resumen del diagnóstico y tratamiento quirúrgicos del quiste hidatídico del pulmón se presenta.

Los autores analizan la experiencia obtenida en el Instituto de Cirugía Torácica (Buenos Aires) en el tratamiento de 200 casos de quiste hidatídico en los cuales 93 resecciones pulmonares, 81 marsupializaciones, 45 operaciones de Posadas y 5 otros procedimientos fueron hechos, según la configuración patológica de los quistes y condiciones del pulmón.

RIASSUNTO

Viene presentato un breve studio sulla diagnosi e sulla cura chirurgica dell'idatidosi polmonare.

Viene riferita l'esperienza ottenuta all'Istituto di Chirurgia Toracica di Buenos Aires nella cura di 200 casi di echinococcosi polmonare: si fecero 93 resezioni del polmone, 81 marsupializzazioni, 45 operazioni di Posadas e 5 altri interventi, in rapporto alle caratteristiche anatomiche della cisti e a quelle del polmone.

SUMARIO

Apresenta um breve resumo do diagnóstico e tratamento cirúrgico do cisto hidatídico do pulmão. O A. analisa a experiência colhida no Instituto de Cirurgia Torácica

(Buenos Aires) pelo tratamento de 200 casos de cisto hidatídico, nos quais, executou, 93 ressecções pulmonares, 81 marsupializações, 45 operações de Posadas além de 5 outros métodos, tudo de acordo com os aspectos patológicos dos cistos e com as condições pulmonares dos pacientes.

ZUSAMMENFASSUNG

Es wird ein kurzer Überblick über die Diagnose und die chirurgische Behandlung der Echinokokkuszyste der Lunge gegeben.

Die Verfasser erläutern ihre im Institut für Thoraxchirurgie (Buenos Aires) mit der Behandlung von 200 Fällen von Echinokokkuszysten gewonnenen Erfahrungen. Je nach der pathologischen Gestalt der Zysten und nach dem Zustand der Lunge wurden 93 Lungenresektionen, 81 Zysteneinnähungen, 45 Posadasche Operationen und 5 andere Eingriffe ausgeführt.

RÉSUMÉ

Un bref résumé du diagnostic et du traitement chirurgical du kyste hydatique du poumon est présenté.

L'auteur analyse les résultats obtenus à l'Institut de chirurgie thoracique de Buenos Aires, dans le traitement de 200 cas de kyste hydatique (avec 93 résections pulmonaires, 81 marsupialisations, 45 opérations de Posadas, et 5 autres techniques), selon les caractéristiques pathologiques des kystes et l'état pulmonaire.

BIBLIOGRAPHY

(Trabajos del autor y sus colaboradores sobre hidatidosis)

Taiana, J. A., y Orsi, A.: Quiste hidatídico del pulmón y vacunación pleural. Bol. del Inst. de Cl. Quirúrg. 18:89, 1941.

Taiana, J. A.; Perez, B., y Boragina, R. C.: Equinococcosis pulmonar. Cavidades residuales visualizadas por broncografía. Bol. del Inst. de Cl. Quirúrg. 19:545, 1943.

Taiana, J. A.; Orsi, A., y Spirito, E.: Hidatidopleura. Pionemotórax consecutivo a la rotura traumática de un quiste hidatídico del pulmón.

to resume its normal condition 4 *Reduced concentration of dye* It is possible that this might have an effect on the colour displayed in a small proportion of cases, but if so the most likely explanation would be the presence of local circulatory inadequacy, so that this is not a serious difficulty from the point of view of the present observations 5 *Sick mice* may sometimes show yellow areas and in a few cases acid staining of entire mice has been seen Such phenomena offer little difficulty, however, as the animal is obviously abnormal, often cold, and usually dies shortly afterwards It is not unlikely that the staining in these cases is referable to anhydramia, a condition which Rous and Drury (1929) have experimentally shown to be capable of producing yellow areas in stained mice 6 *Tumour glycolysis with lactic acid production* This is unlikely for reasons that will appear later

The first warts appeared about the same time and the incidence of the two processes thereafter increased with the passage of time

TABLE I

Frequency of yellow areas in vitally stained mice undergoing treatment with various carcinogenic agents

	Total mice at beginning of experiment	Survivors after 15 weeks	Number showing yellow areas at some stage
Tar	106	61	43 (70 per cent)
1 2 5 6 dibenzanthracene	60	46	28 (61 per cent)
1 2 benzpyrene	50	32	25 (78 per cent)

In some animals the yellow areas persisted for some weeks, in others they were more fugitive in character In a few mice the whole of the tarred skin became orange in colour, in others there was a punctate yellow mottling throughout the painted area and the impression exists that multiple tumours were unusually frequent in such instances It will be seen (table I) that more than two-thirds of the mice which survived for 15 weeks showed yellow areas at some stage of the experiment There appeared to be a significant relationship between the colour change and the appearance of tumours Table II shows that out of 104 tumours obtained, 68 made their first appearance in juxtaposition to yellow areas in the skin, while only 5 tumours (in three animals) were first seen at unrelated sites in animals showing simultaneous yellow foci The remaining 31 tumours were not associated with yellow changes at the time of their first appearance, but this figure is not surprisingly high when it is remembered that the change is frequently of an evanescent nature and it may well be

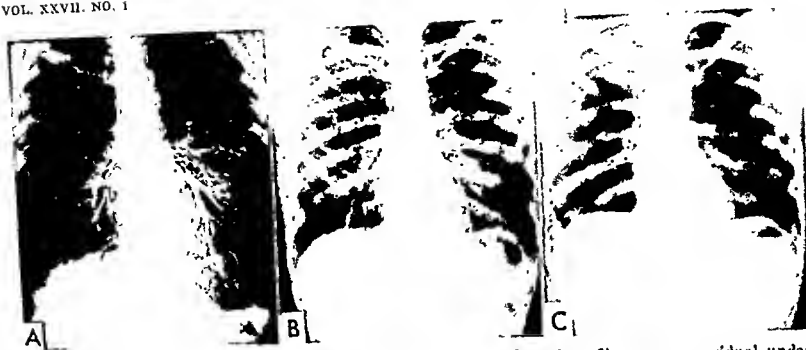


Fig. 1.—A, bronchogram of T. G., a 20-year-old man with a tuberculous fibrocaseous residual under the right clavicle. Aqueous dionosil in right bronchi and lipiodol in left. Peripheral filling to terminal bronchi is somewhat better with aqueous dionosil, which tends to coat bronchi rather than pool in them. B, film taken two hours later, showing clearing of the media but with alveolar filling in left lung by lipiodol. C, six weeks after segmental resection of right upper lobe. "Contrast medium infiltrate" of lipiodol in left lung could readily be confused with contralateral spread of tuberculosis.

tails of any progressive lesion.

The search for a new type of contrast material led to the development of water-soluble media that are rapidly absorbed after intratracheal instillation. Morales and Heiwinkel,²⁴ in 1948, used 35 per cent diotrast in 2.5 per cent carboxymethylcellulose as the first of such media. Subsequently, Atwell²⁵ performed bronchographic studies with this preparation, encountering no serious reactions.

Several other water-soluble compounds became available, some of which had iodo pyracet (diodrast) as the contrast medium. Others used urokon in the same manner. The vehicle common to all these media is some form of methylcellulose, a synthetic carbohydrate of high molecular weight. The viscosity of the medium used may be altered by adding varying amounts of the carbohydrate. When the contrast material is of sufficient concentration to produce sharp contrast and the medium is at a desirable viscosity, however, it is hypertonic. Clinically, the water-soluble media have proved irritating, owing to this hypertonicity,²⁶ which makes satis-

factory anesthesia difficult to achieve.

Some studies have shown methylecellulose to be nontoxic to tissues.²⁷ Other reports²⁸ indicate that a cellulose synthetic, though nontoxic, acts as a foreign body in the alveoli and bronchi, causing foreign body granulomas and fibrosis. Even small masses could be observed in surgical specimens. Although this perhaps has no great significance in the relatively normal lung, it may be quite deleterious to the already damaged lung.

Although initial studies were promising, in 1953 Peck²⁹ reported 2 sudden deaths after the use of these water-soluble compounds. One patient, who had been tested for sensitivity, died after bronchographic examination with the diodrast preparation. The other death occurred during the use of urokon in methylcellulose. The patient in this case had not been tested for sensitivity in advance.

During 1953, Tomich, Basil and Davis³⁰ of England investigated the behavior of a third type of bronchographic medium. This was a suspension, either aqueous or oily, of the n-propyl ester of 3:5-DI-IOPI

colouration developed in the first weeks and was of a degree similar to that observed in the case of tar. In its early effects, benzpyrene was in general more like tar than dibenzanthracene, notably in the rapidity of epilation, which in many cases was well marked at the time of the second weekly application. The first yellow areas were observed after seven weeks, the first two tumours at eight weeks, and the first direct association of yellow colour and tumour at the ninth week (table III). The subsequent rate of appearance of the tumours was rather greater than in the case of tar, 50 per cent of the survivors showing warts after 14 weeks as compared with 17 to 18 weeks for tar (Orr, 1934). Almost 80 per cent of the

TABLE III

Time of first appearance of yellow areas and tumours

	Earliest time of appearance (in weeks from beginning of experiment) of		
	yellow areas.	tumours	direct association of tumours with yellow areas
Tar	9	9	9
1 2 5 6 dibenzanthracene	16	15	16
1 2 benzpyrene	7	8	9

benzpyrene mice which survived long enough showed yellow areas at some time or other (table I). Of the tumours arising in mice with yellow areas, approximately two-thirds were related to these areas (table II). The fact that the proportion of tumours occurring away from the yellow areas is higher than in the case of tar or dibenzanthracene has not been explained, but it may possibly be related to the earlier appearance of benzpyrene tumours, to their more rapid growth, or to their greater tendency to early multiplicity, which obscures the vitally stained picture. Here again, vigorous growth of the tumours was frequently associated with non-persistence of the yellow colour.

Malignancy

The question of malignancy can now be dealt with in connection with all three series of animals. It is never possible to state the exact moment at which a tumour has become malignant; the principal criterion one possesses is that of invasive growth with its associated changes, and as this is presumably the result rather than the cause of malignancy, it follows that any given tumour must of necessity be malignant for some time before its cancerous

stration of the bronchi. Evaluation of subsequent films always showed marked filling of the alveoli with lipiodol, but not with the other agents.

The sharpness of the contrast is definitely superior with lipiodol, and this can be obtained with less material. We usually required 15 cc. of dionosil per side to obtain satisfactory visualization, as compared to approximately 10 cc. per side for lipiodol. None the less, the dionosils do afford very satisfactory contrast to demonstrate endobronchial pathologic change. Here again the oily dionosil appears superior to the aqueous. With aqueous dionosil the sharpness of contrast tends to disappear so rapidly that the interval between injection and the roentgen exposure should not be greater than ten minutes. Roentgenograms of the chest taken subsequent to the obtaining of bronchograms revealed complete clearance of the dionosils in nearly all cases within three days and in all cases within five days. Lipiodol was always discernible for as long as a month after injection, often for six months, and in one case for two years.

No deaths or serious complications due to any of the agents occurred in this series. In more than 300 bronchograms (including those of the present study) taken with various media in patients with tuberculosis, no undue effect of the tuberculous lesion has ever been noted. The only significant complication occurred in a patient who had been given aqueous dionosil, early in this series, before careful attention was being paid to removing as much of the medium as possible. Shortly after completion of the bronchograms the patient became dyspneic and cyanotic. Bronchoscopic examination revealed the dionosil to be caked along the entire tracheobronchial tree. Large quantities of this were aspirated, with partial clearing of the symptoms, but it was several hours before the patient was completely normal clinically.

SUMMARY AND CONCLUSIONS

1. A comparative study has been made of the relative merits of lipiodol, aqueous dionosil and oily dionosil for bronchographic studies.

2. Lipiodol appears to be extremely satisfactory except that persistent infiltrates of the medium remain in the lungs for extended periods, obscuring the details of progressive lesions.

3. Aqueous dionosil was relatively unsatisfactory, as it proved irritating and gave the poorest contrast of the three media studied.

4. Oily dionosil proved quite satisfactory, giving excellent bronchograms almost on a par with those obtained with lipiodol, being nonirritating and quickly disappearing from the lung parenchyma.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Es liegt eine vergleichende Untersuchung der Vorzüge von Lipiodol, wässrigem Dionosil und öligem Dionosil in der Bronchiographie vor.

Das Lipiodol erwies sich als ein zufriedenstellendes Mittel mit der Ausnahme, dass es hartnäckige die Lunge infiltrierende Reste für längere Zeiträume hinterliess, wodurch die feinen Einzelheiten eines fortschreitenden Krankheitsprozesses verdeckt wurden.

Das wässrige Dionosil war verhältnismässig unbefriedigend, weil es Reizerscheinungen hervorrief und von geringerer Kontraststärke als die beiden anderen Mittel war.

Das ölige Dionosil führte zu recht befriedigenden Resultaten und produzierte ausgezeichnete Bronchiogramme, die den mit Lipiodol erzielten fast gleichkamen. Es war reizlos und verschwand nach kurzer Zeit aus dem Lungengewebe.

y frios; tibial anterior y pedia izq. no laten; índice oscilométrico disminuido, especialmente el izqdo.; termometría muy disminuida, especialmente izq. con elemento espasmódico presente muy atenuado; hipertrofia ventricular izquierda; lesiones de fondo de ojo grado 2.

En estos dos casos encontramos un síntoma de primerísima importancia en el diagnóstico diferencial entre la Tromboangiitis obliterativa y la Arterioesclerosis obliterativa, cual es la presencia de lesiones esclerosas retinianas, constantes en esta última, y ausentes en general, en la primera. Ahora bien, Sanchez, como si dudara él mismo del diagnóstico, que sin embargo consigna como hecho en Panamá y ratificado en Nueva York, asienta en letras mayúsculas: "Fondo de ojo: Arterioesclerosis Incipiente"; Perez Carreño, a su vez señala que su caso, estuvo hospitalizado en otro Servicio quirúrgico, con diagnóstico de Hipertensión esencial y arteriopatía de tipo Leo Buerger: cuando ingresa a su Servicio, un año después, ya intervenido de toraco-simpaticectomía bilateral y esplanicnecotomía, tiene 41 años de edad, Mx 190 y mn 85, hemiplejía izquierda, hipertrofia ventricular izquierda, Keith-Wagner

2 en fondo de ojo: ¿No es cierto que este cuadro evoca mas bien el diagnóstico de arterioesclerosis que el de tromboangiitis?

Sin embargo, a pesar de la importancia que atribuimos al fondo de ojo para el diagnóstico no nos atrevemos a pronunciarlos definitivamente sobre ello, en el primer caso por la autoridad de los medios científicos donde fué dictado el diagnóstico, y en el segundo por estar de por medio la talla científica del antiguo Interno del Hospital Vargas del primero de nosotros, y Profesor de Clínica Quirúrgica del segundo, e indiscutiblemente uno de los cirujanos venezolanos de mas amplia ilustración y experiencia en lo relativo al campo de las arteriopatías.

Desde el punto de vista exclusivamente clínico, Silbert trae el siguiente cuadro para el diagnóstico diferencial entre arterioesclerosis y tromboangiitis.

Nosotros hemos elaborado para nuestras clases de Clínica Quirúrgica, extrayéndolo de lo expuesto por Wright en su Manual of Vascular Diseases in Clinical Practice, el siguiente cuadro:

<i>Tromboangiitis:</i>	<i>Arterioesclerosis:</i>
Aparenta menos edad	Aparenta mas edad
Color del cabello normal	Color del cabello generalmente gris
No hay arcos seniles	Frecuentemente presentes
Arterias retinianas normales	Generalmente escleróticas
Presión arterial generalmente baja	Presión a menudo alta
Arterias radial y temporal suaves	Radial y temporal gruesas y duras
Extremidades superiores frecuentemente complicadas	Extremidades superiores rara vez complicadas
Arterias gemorales frecuentemente complicadas	Femorales rara vez obstruidas
No hay calcificación de los vasos a los Rayos X	Calcificación de los vasos frecuente
Volúmen de la sangre generalmente disminuido	Volúmen de la sangre generalmente normal
Síntomas de arterioesclerosis coronaria raros	Síntomas de arterioesclerosis coronaria frecuentes
Aorta aparece normal a los Rayos X	Aorta algunas veces alargada
Albuminuria rara	Albuminuria es común
Historia de flebitis migratoria frecuente	Historia de flebitis migratoria rara

1

Con tantos elementos a que atender se comprende que no pueda propugnarse un tratamiento único y sistematizado para todos los casos de tromboangiitis: como quiera que ello sea, la realidad es que con los modernos tratamientos se ha logrado reducir la rata de amputaciones que antiguamente alcanzaba mas del 70% hasta menos del 5%.

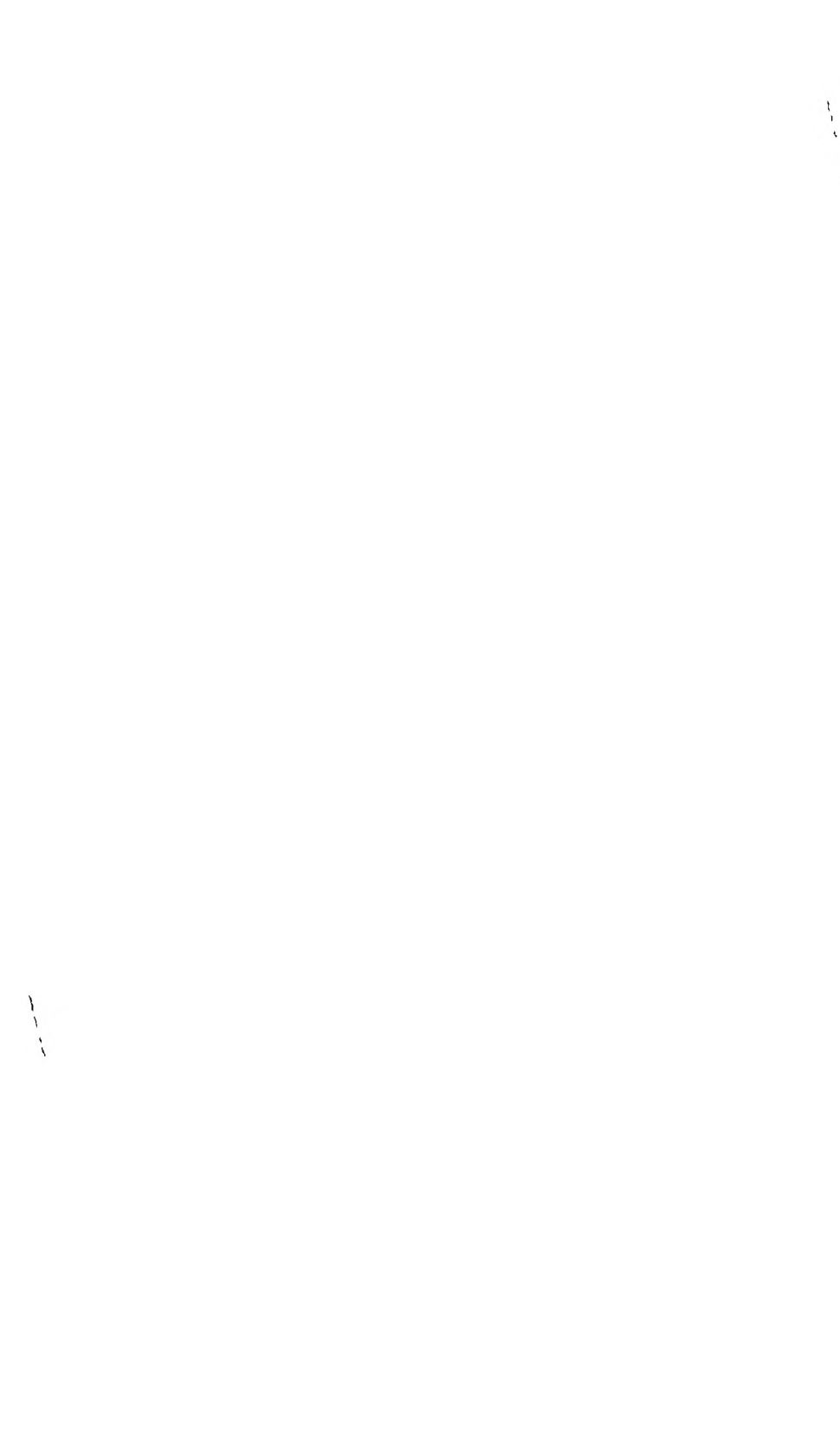
Sintomáticamente, como dice Leriche, toda la enfermedad está dominada por el espasmo, contra el cual, afortunadamente, estamos bien armados y que podemos combatir por los medios siguientes:

- a) por la *arteriectomía*, cuyo carácter dominante de intervención vaso-dilatadora la hace similar a la *gangliectomía*, cuyos resultados buenos o mediocres, comparte;
- b) por la *gangliectomía lumbar*, la cual, cuando la circulación periférica está todavía asegurada por la replesión a contra-corriente de la vía principal mas allá de la obliteración, da resultados notables, pudiendo hablarse de curación durante años, y a veces definitivamente. Pero aún así, esta intervención no ataca la condición etiológica, y la enfermedad es capaz de reiniciar su evolución, despues de una larga, aparente detención. La operación de Diez cura los síntomas, no cura la enfermedad. (Leriche)
- c) por la *adrenalectomía*, única intervención que ha dado resultados completos y duraderos (15, 16 años), hasta el punto de que en opinión de Leriche, se podría hablar de curación definitiva, sin nuevos brotes evolutivos ni nueva localización del mal. Pero, desgraciadamente, la operación de von Oppel no asegura ni mucho menos de manera absoluta la detención de la enfermedad; ora, porque practicada demasiado tarde, cuando existen ya trombosis que evolucionan por su propia cuenta; ora

porque se ejecuta una intervención insuficiente, no extirpándose sino una glándula o sea la mitad del tejido endocrínico responsable o bien porque la glándula restante se hipertrofia y adquiera una mayor actividad. Estos hechos son fundamento de quienes opinan que en la base etiológica de la tromboangiitis es necesario tomar en consideración un desequilibrio endocrínico suprarrenal. Para obviar una posible hipertrofia de la suprarrenal restante, hay quienes aconsejan la sección de los esplanquicos.

Desde el punto de vista anatómico y fisiológico, no es fácil la supresión del trastorno circulatorio: un arteriectomizado, un simpaticectomizado lumbar, un adrenalectomizado, aun cuando reaparezcan las oscilaciones, aun cuando la temperatura cutánea vuelva a la normal, permanece en las mismas condiciones de un arterítico obstruido: con objeto de remediar esta situación, Reynaldo dos Santos resucitó, hace ya mucho años, la primitiva idea de Leriche, de reemplazar el segmento arterial trombosado por un injerto venoso; ignoro hasta que punto se han proseguido las experiencias de dos Santos h., quien logró el funcionamiento correcto de injertos venosos en perros; posteriormente se han practicado injertos arteriales (Leriche, Fontaine, etc.).

Mas tarde, se pensó por un momento que la solución estaba en la "endarteriectomía desobliterante" de Bazy y Réboul, modificación de la primitiva técnica de la endarteriectomía de dos Santos h., la cual consiste en la extirpación, a cielo abierto de la endoarteria y el trombo en un solo bloque, con lo cual se ha logrado, en muchos casos, repermeabilizar los vasos trombosados, a veces definitivamente; pero aparte de que los resultados finales de esta intervención no son mejores que los de la arteriectomía, sus dificultades técnicas y



zona de la piel sana (Fig. 1, A y B).

En la cara plantar correspondiente a la misma zona hay una ulceración de un cm. de profundidad que rezuma un líquido oscuro, espeso, mal oliente. Piel fría y sudorosa (sic).

La arteria femoral late bien; la poplitea, tibial anterior y pedía, no laten; las arterias del miembro izquierdo laten normalmente. Oscilometría: ver fig. 2 (oscilómetro de Collens). Termometría: ver fig. 3 (Dermalor Tyco).

Cosasesco negativo; repleción venosa de Collens, fuertemente positiva.—El ángulo de suficiencia circulatoria y el tiempo y distancia de claudicación no pudieron investigarse debido al intenso dolor del enfermo.—Rubor de declive, aumentado.



Fig. 1.—A, fotografía del pie del paciente (cara dorsal) al entrar al Servicio. B, fotografía del pie (cara plantar) en la misma época.

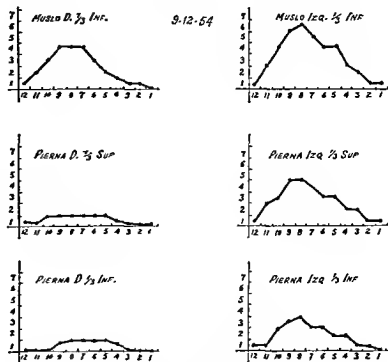


Fig. 2.—Curvas oscilométricas (Collens) al ingresar el paciente.

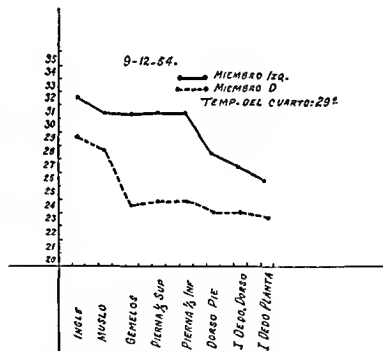


Fig. 3.—Curvas termométricas (Dermalor) en la misma época.

Exámenes de laboratorio: Kahn: 0; Glicemia: 1,08;—Urea: 0,50;—CRG: 3.860.000;—Hgbl.: 78%;—CBG: 32.000;—Índice de Katz: 30;—Hemograma de Shilling: N 86%;—T. sangría: 2'15"; T. coagulación: 5';—Tiempo protrombina 16";—Orinas: normal;—Heces: 0—Radioscopia broncopulmonar: normal.—Exámen de fondo de ojo: normal.

around the tumours, as it has been seen that not only does the yellow colour frequently precede the appearance of a tumour, but that usually the most actively growing tumours show no surrounding yellow zone

That there is a genuine association between the conditions which cause the acid colour to appear and those which determine the genesis of tumours is strongly suggested by the data summarised in tables II and III, and it is perhaps worth emphasising that the increase in the latent period with dibenzanthracene as compared with tar and benzpyrene is of a similar magnitude as regards both phenomena (table III)

Control observations

It was desirable that these results should be controlled by observing the results obtained with irritants of a non-carcinogenic nature. Four such irritants were tested: mustard gas, cantharidin, croton oil and iodo-acetic acid. The concentrations employed were those which Berenblum (1935) had found to cause anatomical changes of similar nature and degree to those produced by a potent carcinogenic tar. Forty white mice were used, ten with each irritant substance, and weekly applications were continued for 19 weeks. With one exception, yellow staining was never observed in these mice except around occasional healing ulcers. The exception was an animal which died two days later, and there are thus adequate grounds for attributing the yellow staining to conditions outside the experiment, as it has been mentioned already that such changes may occur in sick mice.

The yellow staining around ulcers was seen during the phase of active healing and not at other stages. Six stock mice with spontaneous skin lesions were stained with phenol red, with similar findings. The yellow colour was not seen during the early stages of ulceration, when the tissues were breaking down, but appeared round ulcers in which repair had started and disappeared when healing was complete. The most probable explanation would seem to be that during active reparative proliferation the elaboration of metabolic products is disproportionate to the capacity of the available transport media to deal with them. It is of interest to recall that Rous (1926) completely detached a portion of skin from mice and immediately replaced it in its original position, and followed the subsequent course of events with phenol red. Healthy grafts were always more acid than the mouse itself in the intervening days, while if the graft displayed the same colour as the animal, it failed to take.

RESUMEN

Se discute el lugar de la *arteriectomia* en el tratamiento de la enfermedad de Winiwarter-Buerger, puntualizando sus beneficios, derivados de la supresión de los reflejos arterio-arteriales patológicos vasoconstrictores, lo cual provoca una mejoría de la circulación del miembro; se pondera la ventaja de la posibilidad de practicar el examen anatómico-patológico que daría el diagnóstico preciso.

Se hacen notar los buenos resultados obtenidos por la combinación de la operación de Leriche con la administración de vacuna anti-tifoidea, según las normas de Wright, y Allen y as.

Se propone, por vía de estudio, el tratamiento sistemático de la enfermedad de Winiwarter-Buerger, con la siguiente escala ascendente:

- 1) arteriectomia y examen histopatológico.
- 2) vacuna anti-tifoidea, ganglioplégicos, infiltración novocaínica, tratamiento sintomático.
- 3) operación de Diez (gangliectomia lumbar).
- 4) operación de von Oppel (adrenalectomia).
- 5) excepcionalmente, amputación.

RÉSUMÉ

Les auteurs discutent le lieu de l'*artériectomie* dans le traitement de la maladie de Buerger, insistant sur ses avantages qui dépendent de la suppression des réflexes vasoconstricteurs artério-artériels, ce que améliore la circulation du membre. Ils mettent en évidence les avantages de l'examen pathologique qui permet un diagnostic définitif.

Les bons résultats obtenus en combinant l'opération de Leriche avec l'administration de vaccin typhoïdique comme le conseillent Wright et d'autres auteurs, sont soulignés.

Il est proposé de traiter expérimentalement la maladie de Buerger dans la progression suivante:

1. Artériectomie et examen pathologique.
2. Utilisation du vaccin typhoïdique, de ganglioplégiques, d'infiltrations ganglionnaires à la novocaïne, et traitement symptomatique.
3. Opération de Diez (sympathectomie lombaire).
4. Opération de von Oppel (suprarénalectomie).
5. Exceptionnellement, amputation.

RIASSUNTO

Viene discussa l'importanza dell'*arteriectomia* nella cura del morbo di Buerger, quale metodo sapace di sopprimere i riflessi vasocostrittori vaso-vasali con conseguente miglioramento del circolo dell'arto.

Vengono ricordati anche i buoni risultati ottenuti combinando l'operazione di Leriche con la somministrazione di vaccino tifoide, come suggerito da Wright.

Si propone il seguente schema di cura:

1. Arteriectomia ed esame del pezzo.
2. Impiego del vaccino tifoide, di ganglioplegici, di procaina per infiltrazioni lombari.
3. Opération de Diez (sympathectomie lombare).
4. Opération de von Oppel (suprarénalectomia).
5. Exceptionnellement, amputation.

ZUSAMMENFASSUNG

Die Verfasser erörtern die Stellung der *Arterienresektion* in der Behandlung der Winiwarter-Bürgerschen Krankheit und heben den Nutzen der Operation hervor, der auf der Unterdrückung der pathologischen vasokonstriktorischen arterioarteriellen Reflexe beruht. Dies verbessert den Blutkreislauf in der Gliedmasse. Die

ly remarked, there is little profit in trying to achieve peaceful coexistence with a man-eating tiger.

As every acquaintance of the College is aware, the position taken in our *Credo* applies to oppressors only, not to their victims. Those who suffer the onslaughts of catastrophe, whether in the course of nature or imposed by the barbarous inhumanity that still exists in humankind are invariably our first consideration. When the people of the Netherlands were overwhelmed by floods, great numbers being left homeless and helpless, we sent some aid immediately. We have participated actively in the sending of CARE packages to many parts ever since this avenue of help was opened. Our sense of the tragic need of the world for aid and understanding, always acute, has been further heightened by the agonizing bulletins still coming in from Hungary. Long before Dr. Kline's letter arrived, the College had acted; a special meeting of the Board of Governors had been called, and an immediate grant in aid of one thousand dollars had been cabled to our colleagues, Drs. Mandl, Schönbauer and Kline and their co-workers, who are indeed "tearing themselves apart" in the effort to alleviate the sufferings of those who thought freedom worth bleeding and dying for. One need not be an American to share this principle, for it is universal, thank God; an inheritance of the Divine that exists in every human soul and, once allowed to rear its head, cannot be destroyed. Those who gave their consent to the Nazis, those who countenanced and still countenance the Communist regime, those who have adhered and catered to despotism through every age of human history, have done so for two reasons only: ignorance and fear.

Fear does strange things to the heart and mind of man. Were it not for fear, it would be incredible that any human being, much less a whole population, could

remain in ignorant obedience to tyranny, with the evidence plain before him and the stench of infamy in his nostrils all day long. But add fear—desperate fear, fear for one's life and one's loved ones, fear not only of death but of slow death by torture, physical, mental and spiritual, and this ignorance becomes comprehensible. Why? Because *fear, grown great enough, leaves no room in man's mind for perception of anything else.*

All tyrants and would-be tyrants, from the petty blackmailer in civilian life to the dictator whose lust for power makes him regard his murdered victims as just so much dead meat, are well aware of this fact. If they were not, they could not retain their power as long as they do. They know that if they let in one ray of light there will be revolt, and once that has happened all is lost. Suppose, for example, that the Russians succeed—and they have not yet done so—in quelling the Hungarian rebels altogether. How long will it last? History supplies the answer. A new generation of Hungarians has caught its first glimpse of freedom and found it good. Eventually, therefore, and inevitably, unless man succeeds in destroying man altogether, *Hungary will be free.* Nor will she stand alone, for the stark heroism of her unequal struggle has intoxicated the world. The other Iron Curtain countries are seething with it, as the situation in Poland proves. The Soviet must look to its fences, and build them of stronger barbed wire than ever before, or there will soon be trouble on the home front also. The Russians are human too, as their ridding themselves of the Tsarist yoke has demonstrated. Let them once understand how abysmally they have been fooled, and there will be little more to dread from that direction.

It is this hope—this certainty, rather, if history is to be believed—that has led the College to give its official approval to

Case report

Clinical history (Dr Saxby Willis)

The patient, Mrs E T, aged 62 years, was a widow, and by occupation a cook housekeeper. She was under my observation from 1920 to the time of her death in 1934. During the greater part of her life she suffered from intermittent hæmorrhages from various sources and cutaneous telangiectases, which tended to occur in crops at intervals of a few months. When she first came under observation she complained of rheumatic pains and an active corneal ulcer, from which she had suffered on previous occasions. At this time, it was noted that she was pale and that she had several small nævi on her face. She gave a history of having suffered from nose bleeding from the age of 17 up to the time of her marriage and less frequently from then onwards. She is said by her friends to have been habitually pale from childhood and to have been frequently ailing.

She had five children of whom only one survives when last heard of he had been invalided from the Army with "heart trouble." Another boy died in the Middlesex Hospital at the age of seven, from rheumatic carditis. The other three died in infancy, one from diphtheria and the other two from some form of intestinal trouble. One of these was said to have had "consumptive bowels." The patient had one brother (still alive) and no sisters. The brother is now aged 68 and in apparently good health, but between the ages of 20 and 25 he suffered from nose bleeding. When seen recently it was noted that a few spider nævi were present on his face. Her father died at the age of 65 from "pernicious anaemia." He is known by the surviving son to have suffered from nose bleeding up to the age of 45 and to have had rheumatic fever in his youth. His wife died at the age of 63 from bronchitis, and there does not appear to have been any hæmorrhagic tendency on her side of the family. All the grandparents of Mrs E T lived to old age and there is no record of any hæmorrhagic tendency.

In 1925 she developed acute pleurisy on the right side, from which she made a good recovery. In 1926 she was admitted to the Hampstead General Hospital, where Mr Arthur Gray performed hysterectomy for uterine fibroids. At this time her general condition was fairly good, but she had a secondary anaemia (Hb 50 per cent). X ray examination of the chest showed soft round shadows at the root of the right lung, with an area of collapse beyond. There was also a *B coli* infection of the urinary tract. Small spider like nævi were present on the skin of the face, and a few telangiectases on the chest, abdomen and back.

She was next seen in 1927, with anaemia and cedema of the legs, and in 1928, 1929, 1930 and 1931 she was an in patient, with relapses of the anaemia. In 1931 it was found that blood was present in the gastric juice. In 1932 it was noted that the telangiectatic manifestations were more copious, not only were they present in the situations above mentioned, but also in the mucous membrane of the mouth, palate and nose, and on the palmar surfaces of the fingers of both hands. They had the appearance of small subcutaneous hæmorrhages about the size of a pin's head and were dark red in colour, they came out in crops. X ray examination of the chest showed enlargement of the heart shadow, in the right lower lobe there were three shadows of doubtful nature—(?) recent broncho pneumonia, (?) hæmorrhagic.

In 1933 she became more dyspnoeic and secondary anaemia was again present. Blood was present in the stomach contents and occult blood in the stools. The telangiectases were particularly noted by Mr Zamora

Neurological Nursing. By John Marshall Sr., Springfield Ill.: Charles C Thomas, Publisher, 1956. Pp. 166, with 83 illustrations.

This monograph is written for the neurologic and neurosurgical nurse but will be of great value to resident physicians on neurologic or neurosurgical services and will be of interest to neurologists, neurosurgeons, physiotherapists and social workers connected with the care of neurologic patients. It is concise, well written and illustrated. American readers will be impressed by the apparent responsibility of nurses in the British Isles for procedures that in this country are usually reserved for physicians. All technical procedures are described in detail, and the book is well illustrated with diagrams and photographs. In illustrations showing the posturing of the prone patient, however, no provision is shown for support of the head, although other details are meticulously illustrated and described.

The care of the unconscious patient and the skin and bladder of the paraplegic patient are especially well covered. Perhaps one of the best features of the work is the emphasis on the proper psychic approach to patients with neurologic disease and the repeated illustrations of the value of proper attitude and approach on the part of the nurse, as well as the scope of the role she may play in the education of the patient.

This book is well worth reading for everyone concerned with the care of the neurologic or neurosurgical patient.

HAROLD C. VORIS, M.D.

The Dental Treatment of Maxillo-Facial Injuries. By William Kelsey Frya and Terence Ward. Springfield, Ill.: Charles C Thomas, Publisher, 1956. 2d ed. Pp. 372, with 383 illustrations.

This book is the second edition, appearing after an original printing in 1942 and a re-

vised edition in 1945. Therefore, it is more complete in many areas such as antibiotics, treatment of complications and the use of bone grafts. Although not voluminous, under 400 pages, the authors have covered the entire field of oral surgery and maxillo-facial injuries. The book is concerned primarily with traumatic conditions and includes chapters such as "pathology of bone repair," and "loss of tissue." It is well written and contains adequate photographs, pictures and diagrams. The book is indexed but does not have a bibliography.

ARNO LESHIN, M.D.

Dermatology. By Donald M. Pillsbury, Walter B. Shelley, and Albert M. Kligman. Philadelphia: The W. B. Saunders Company, 1956.

This is a complete, up-to-the-minute text by three outstanding practitioners from a leading training center for dermatologists. The authors are distinguished investigators in cutaneous medicine, which may account for the volume's vital, dynamic flavor. This notable book marks a new era in dermatologic texts with its iconoclastic attitude toward many outworn shibboleths. The result is fresh and moving. There is no padding with discarded theories and therapy, though this is a large work and fully authoritative. Basic throughout is a broad, fundamental biologic approach. This signifies a platform for easy understanding by general practitioner and specialist. Yet the book is a complete and adequate reference for the experienced dermatologist. The latter may miss listings of pertinent literature; for others this omission makes for easier, uninterrupted reading. Several chapters by contributing authorities are valuable. The printing, binding and other physical aspects help to make the book a distinguished text for biologist, the general physician and the specialist.

THEODORE CORNBLEET, M.D.

Heart (460 g) Pericardium normal There was slight hypertrophy of the left ventricle, which showed fatty striation There was some fibrosis of the papillary muscles and chordæ tendineæ of the mitral valve and the aortic valve was slightly fibrous otherwise the valves were normal The coronary arteries and main vessels in the thorax and neck were healthy

Aorta Size normal, a few fatty patches in the intima

Peritoneum Healthy except for adhesions in the pelvis at the hysterectomy site

Stomach and intestines There were numerous telangiectases in the stomach and in the first 4 inches of the duodenum (fig 1), but none in the rest of the digestive tract Most of the spots (1 to 4 mm in diameter) were bright red and sharply defined There were also several small hæmorrhagic erosions in the stomach and a few in the duodenum

Liver No enlargement (1320 g) The surface was slightly pitted and there were some stellate vessels under the capsule The cut surface, though firm, appeared fatty and there was no obvious cirrhosis The gall bladder was normal

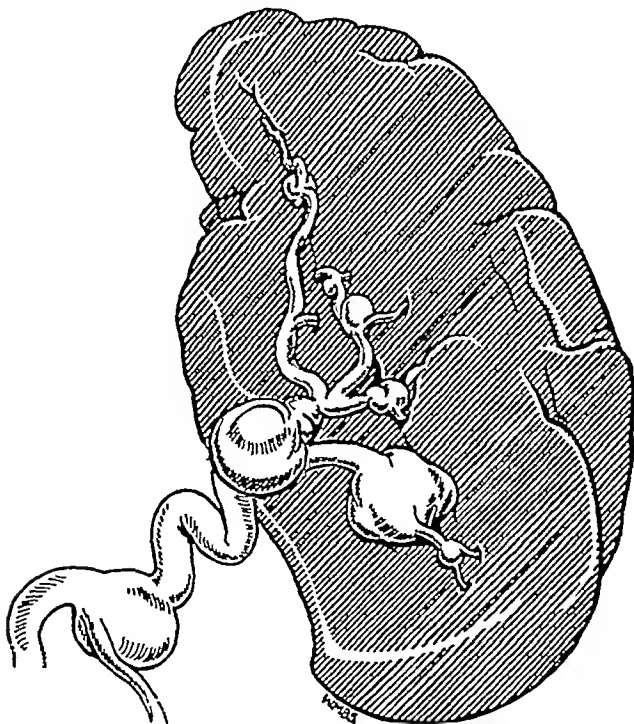
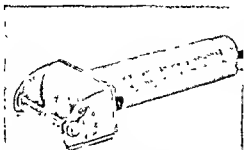


FIG 2—Splenic artery with multiple aneurysms $\times \frac{1}{2}$

Spleen Enlarged and rather soft (400 g), capsule slightly thickened and pitted The pulp was dark red and contained two

THE
ENTIRELY
NEW

Padgett-Hood
**ELECTRO-
DERMATOME**
MODEL B



*Simple!
Quick!*

Gives uniform grafts up to 4 inches in width, and to any length. The Surgeon, using but one hand, can operate this lightweight instrument without assistance. **EXPENDABLE KNIFE BLADE** does not require tools. Switch is located on motor so that the Surgeon can control it with his index finger.

Write Today for Complete Information

KANSAS CITY ASSEMBLY CO.
816 LOCUST • KANSAS CITY, MO.

Sierra®-SHELDEN
TRACHEOTOME

PAT. APPLIED FOR

New! Safe! Fast!



Perform
- COMPLETE
TRACHEOTOMY
IN SECONDS!

Insert
GUIDE NEEDLE;
follow with
- TROCER-TUBE;
Remove NEEDLE,
Remove TROCER,
THAT'S ALL!

Shown above - Complete assembly and replaceable components



Before using, see complete technique packed with Tracheotome

The *Sierra* SHELLEN TRACHEOTOME is a complete Instrument, Scientifically designed—precision made—thoroughly tested and proved on hundreds of cases. Safely-guide needle directs protective balled end of trocar into the trachea. All parts replaceable. Complete, fully illustrated step by step INSTRUCTION BOOKLET packed with each instrument.

"Made for specialists" by specialists "



R.A. HAWKS

WRITE FOR FREE CATALOG

Available through Surgical Supply Dealers

DIVISION Sierra Engineering Co

123 E. MONTECITO AVE., SIERRA MADRE, CALIF.

HAVE YOU CHANGED YOUR ADDRESS?

To insure uninterrupted delivery of your *Journal* please return this coupon or send the same information on a post card to *Journal of the International College of Surgeons, Circulation Office*, 10 Columbus Circle, New York 19, N. Y.

Name _____ Please print

Former Address: _____ New Address: _____

Street _____ Street _____

City _____ City _____

Zone _____ State _____ Zone _____ State _____

For countries outside the United States:

_____ Name of Country



The Journal of the International College of Surgeons

Section II

Vol. XXVII

No. 1

January 1957

Editor-in-Chief

Max Thorek, M.D., Sc.D., LL.D., F.B.C.S. (Hon.),
F.I.C.S. (Hon.), F.P.C.S. (Hon.), F.R.S.M. (Eng.)

Associate Editor

Philip Thorek, M.D., F.A.C.S., F.I.C.S.

Consulting Editor

Morris Fishbein, M.D., F.I.C.S. (Hon.)

Assistant Editors

{ Dorothy Langley
Paula Golick

CONTENTS

Editorial, page 3

Executive Director's Notes, page 6

United States Section: President's Message, page 8

Pen Portraits: *Prof. Dr. Raymond Darget*, page 10

Tenth International Congress, Mexico, page 12

"The Beginnings of Surgery and *The Edwin Smith Papyrus*,"
page 14

Woman's Auxiliary: President's Message, page 22

United States Section: Roster of Regents, Officers and Com-
mittees, page 27

Report of the Committee on Medical Education of the Inter-
national Union Against Cancer, page 28

Section News: *Belgium and Switzerland*, page 29

Medical News Front, page 31

In Memoriam: *Gabriel-Pierre Sourdille*, page 32

girl or two now and then, but otherwise my three assistants and I are trying to handle thousands daily where before we were hard put to handle two or three hundred. Also, the flame is spreading, and while there is no revolt in other Iron Curtain countries neighboring Austria, word has leaked in to them about Hungary and Poland, and other nationalities are streaming into Austria in much larger numbers. They, too, must be cared for—one man is the same as another and nationality means nothing in the great need for help. We generally work from 8:30 A.M. to 10:30 P.M. or sometimes until midnight, when we simply can not write another letter or read another paper. Saturdays and Sundays are no exception. Last Friday I began at 8:30, had a little lunch, then worked straight through until Saturday 2:00 P.M., took a bath, put on slacks, rushed over to the Consulate and packed kit bags, lifted huge boxes, swept away rubbish, etc., etc., until 7:30 that night.

"Went to dinner, found that I couldn't stand up, was put to bed! This isn't a very cheerful letter, is it? Actually, it isn't put half as badly as things really are. You would have to see the refugees to believe it. Now back to the grind. So much to do. I think I'll sneak out for a bite of lunch (almost four o'clock—hadn't realized it) so I can keep at this work. No good if I collapse too, is it? However, I've always been quite a workhorse and feel sure nothing will

happen to me. We're praying that the story of jaundice and polio in Hungary is only a rumor, but I'm afraid it isn't. This will mean that more people will come flooding into Austria to escape these plagues, and it may mean spreading both of them here and into the countries to which we send these escapees. Fortunately, the winter will help us somewhat on this score—or so we think. And so we hope.

"Time to go. Many thanks for your offer. It will not be forgotten and will be used if the time comes, when we handle people this way. Meanwhile, your understanding and your sympathy are appreciated — Heaven knows these people can use large doses of both. Keep well and happy yourself, and I promise that here we will do everything we can."

Such a letter would call for no comment whatever were it not for the fact that one comment cannot be made too often—that which emphasizes, over and over again, the inestimable value of freedom to all mankind. Life is all but worthless without it, as man instinctively knows, though too often he does not realize how infinitely precious it is until he has lost it. In every human heart, as the New Year begins, is the hope that peace and independence lie ahead for the Hungarians and the people of all other captive nations. At the same time, let us recommend to ourselves, and to others in our fortunate and blessed condition, that we guard this priceless treasure now and forever. Once lost, the price of its repossession is high.

Postgraduate Course on Surgery of the Hand at Nanterre given under the auspices of the International College of Surgeons

Dr. Marc Iselin announces that registration is open for the Eighth Course on Surgery of the Hand, to be given September 16-22, 1957, at Maison Départementale de Nanterre, 403, Avenue de la République, Nanterre, Paris (Seine), France. The Sixth Course, meeting from September 24 to September 29, 1956, was attended by twenty-four surgeons, representing eight countries. Application for the Seventh Course, which will convene April 29-May 4, 1957, is already closed.



the character and qualification of its rank and file; not more in the advanced learning of its leaders, than in the prompt uniformity with which scientific discoveries and clinical observations become common property, and thus available to the suffering sick wherever found.

"An aristocracy assumes that there is more wisdom and patriotism in the judgments of a few than in the heads and hearts of the many, but in medicine there are no lords nor house of lords, no monarchies nor monasteries, no dignitaries nor diplomats, no caste, unsupported by character, but every man at once to be, a servant and a king!"¹⁰

Note: I have shamelessly appropriated

ideas and phrases from (1) an article by Amos Koontz, in the July 1956 issue of the *Maryland State Medical Journal*, (2) an address by Umphrey Lee, then President of Southern Methodist University, before the Southern Medical Association, (3) an oration by Professor Gladys Fashena at the graduating exercises of Southwestern Medical School of the University of Texas, (4) a column in the *Dallas Morning News* by The Reverend John F. Anderson Jr., (5) a presidential address before the Southern Surgical Association by Edwin Lehman of Richmond and (6) another presidential address by Charles M. Rosser, delivered to the Medical Association of the Southwest in 1907.]

RESOLUTION ADOPTED BY THE EXECUTIVE COUNCIL, UNITED STATES SECTION

International College of Surgeons
November 17, 1956

WHEREAS numerous authorities in medical and automotive research have gone on record with the results of tests and statistical studies, indicating that safety belts in automobiles will save thousands of lives and prevent or minimize more thousands of injuries, and

WHEREAS the American Association of Motor Vehicle Administrators has recommended in convention that various States and Canadian Provinces, undertaking the regulation of standards for seat belts, base their requirements on the practices recommended by the Society of Automotive Engineers for complete seat belt assemblies, and

WHEREAS the recent adoption of these recommendations and standards by the nation's motor vehicle commissioners will now encourage testing for adequate strength and reliability of all belts manufactured and sold to protect passengers of vehicles from death in the event of accident, and

WHEREAS we believe that present activities to prevent accidents by education, law

enforcement and traffic engineering — which have served so well to reduce the rate of traffic deaths and injuries — must continue, and

WHEREAS we also recognize that great progress in the prevention of injury can also be made in the near future by the nationwide use of seat belts and possibly by other methods that will in many instances completely avoid or moderate injuries to the occupants of vehicles, despite the seemingly inevitable and increasing frequency of accidental crashes,

NOW, THEREFORE, BE IT RESOLVED that the International College of Surgeons place itself on record as encouraging continued research into techniques for the prevention or moderation of injuries and education of the public to utilize the proven and most practical means of reducing deaths and injuries despite accidents.

As surgeons, who see the tragic results of auto accidents at first hand, we believe there is much to be gained by the use of safety belts and the application of automotive designing that will lessen or prevent accidents.

When in Chicago, visit the Hall of Fame and the School of the History of Surgery and Related Sciences of the International College of Surgeons at 1516-1524 Lake Shore Drive, Chicago 10, Illinois.

places it is distended by calcium deposit. At the bifurcation of a tertiary branch the artery shows slight fibrosis of the media, and complete deficiency of the media over the point of the cleft, the gap being filled up by the connective and elastic tissue of the adventitia. The internal elastic lamina continues over the point but stains very poorly (fig 9). There is no intimal hypertrophy and no pouching at this weak spot, but a chance section through a branch junction further along shows a minute dilatation where the media is deficient (fig 10). The pouch is not in the centre of the bifurcation, but at the junction of the lateral wall of the branch and the parent artery, a situation also observed by others to be liable to deficiency of media with dilatation. Section through one of the visible aneurysms shows fairly advanced arteriosclerosis with calcification of the elastic lamina.

Liver There are fibrous dilated veins and dilated capillaries under the capsule corresponding with the naked-eye appearance. Thick strands of fibrous tissue penetrate inwards for a short distance without any small-cell infiltration. There is no general cirrhosis but there is an increase of fibrous tissue at the portal junctions, especially near the surface, which appears as islands in the sections. The most striking arrangement of fibrous tissue is the encirclement of the bile ducts, the ducts themselves appear healthy, without inflammation, dilatation or proliferation. The parenchyma is much congested, with extensive fatty change, vacuolation and the deposition of brown, non-iron-reacting pigment granules.

Kidneys Interstitial fibrosis is the chief feature. A few scattered glomeruli are fibrous. There are a few minute deposits of calcium in the tubules. No arterial changes. The main renal artery shows a little degeneration of the internal elastic lamina with a deposit of fine calcium granules.

Right superior parathyroid The size of the organ is mainly due to increase of fatty tissue which, in places, separates the acinar tissue into small islets. Capillary vessels are numerous and can be seen in close conjunction with the gland acini. The latter are composed of chief cells in solid groups or set round a lumen containing slightly acidophil colloid, these vesicles are more numerous than usual. Some of the cells are foamy with no visible nucleus, but the majority have finely granular protoplasm and well defined granular nuclei. There is slight variation in the size and depth of staining of the nuclei, but they all seem to belong to the same type of cell. No oxyphil cells are seen.

Pancreas There is considerable interstitial fibrosis and the ducts are surrounded by fibrous tissue similar to the peribiliary fibrosis in the liver. There are many dilated lymphatics, some of which contain carbon pigment and lymph. The glandular acini and islets of Langerhans appear normal.

The time of the Congress is so near at hand that persons planning to attend are urgently reminded to register immediately. The Congress will meet at the height of the Mexican tourist season, when accommodations, unless made in advance, are exceedingly difficult to get. The International Travel Services have reserved blocks of rooms in a number of the finest hotels for surgeons and their families. These are

rapidly filling up. Undue delays in announcing your intention to attend may create difficulties and disappointments for late registrants.

Communicate your desire of attendance, hotel reservations, registration and itineraries to International Travel Service, the official travel representatives of the College. The Palmer House, 119 South State Street, Chicago, Illinois.

Combine Business with Pleasure During Your Stay in Mexico

The Tenth International Congress of the International College of Surgeons, which will convene in Mexico City on Feb. 24-28, 1957, has aroused tremendous interest among the surgeons of the United States, Canada, and Central and South Americas. Several hundred representatives of the surgical profession will convene in the historic Mexican capital—The Rome of the Americas—to exchange their experiences and observations.

International Travel Service, Inc., the official travel representative for the International College, have planned and arranged attractive tours before and after the convention. February and March being the best months for a winter vacation and the most pleasant time of the year in Mexico, almost all members who have indicated their intention of attending are planning to take advantage of this unique opportunity of combining scientific learn-

ing with relaxing activities. The travel programs which have proved most popular among those contemplating attendance at this meeting are those that extend from nine to fourteen days.

Incomparable Acapulco and charming Taxco top the list of places that will be visited, but many doctors have expressed their preferences to visit such less known, but no less fascinating, places as Tehuacan, Fortin, Patzcuaro and San José Purua. The demand for first class hotels has been great. It is therefore essential that you make your reservations without further delay unless you are prepared to face the disappointment of not being able to carry out the trip you have been planning. At this eleventh hour, do not delay making your arrangements. Write immediately to International Travel Service, Inc., The Palmer House, 119 South State Street, Chicago 3, Illinois.

For information pertaining to qualifications for
Fellowship or Associate Membership
in the

Canadian Section, International College of Surgeons

please write

E. N. C. McAmmond, M.D.
Suite 2, 1701 West Broadway
Vancouver 9, B. C., Canada

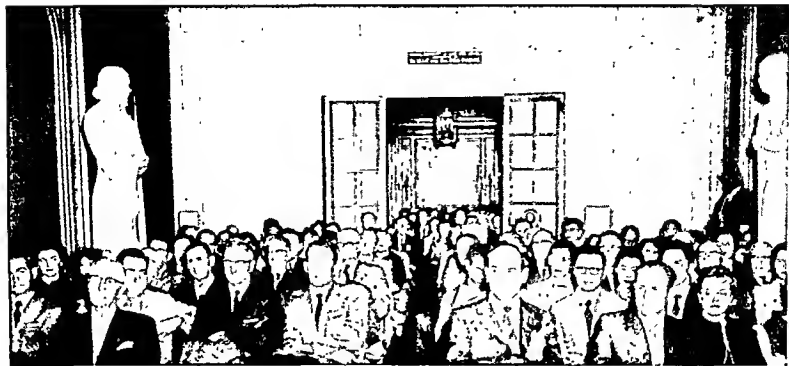
places it is distended by calcium deposit. At the bifurcation of a tertiary branch the artery shows slight fibrosis of the media, and complete deficiency of the media over the point of the cleft, the gap being filled up by the connective and elastic tissue of the adventitia. The internal elastic lamina continues over the point but stains very poorly (fig 9). There is no intimal hypertrophy and no pouching at this weak spot, but a chance section through a branch junction further along shows a minute dilatation where the media is deficient (fig 10). The pouch is not in the centre of the bifurcation, but at the junction of the lateral wall of the branch and the parent artery, a situation also observed by others to be liable to deficiency of media with dilatation. Section through one of the visible aneurysms shows fairly advanced arteriosclerosis with calcification of the elastic lamina.

Liver There are fibrous dilated veins and dilated capillaries under the capsule corresponding with the naked-eye appearance. Thick strands of fibrous tissue penetrate inwards for a short distance without any small-cell infiltration. There is no general cirrhosis but there is an increase of fibrous tissue at the portal junctions, especially near the surface, which appears as islands in the sections. The most striking arrangement of fibrous tissue is the encirclement of the bile ducts, the ducts themselves appear healthy, without inflammation, dilatation or proliferation. The parenchyma is much congested, with extensive fatty change, vacuolation and the deposition of brown, non-iron-reacting pigment granules.

Kidneys Interstitial fibrosis is the chief feature. A few scattered glomeruli are fibrous. There are a few minute deposits of calcium in the tubules. No arterial changes. The main renal artery shows a little degeneration of the internal elastic lamina with a deposit of fine calcium granules.

Right superior parathyroid The size of the organ is mainly due to increase of fatty tissue which, in places, separates the acinar tissue into small islets. Capillary vessels are numerous and can be seen in close conjunction with the gland acini. The latter are composed of chief cells in solid groups or set round a lumen containing slightly acidophil colloid, these vesicles are more numerous than usual. Some of the cells are foamy with no visible nucleus, but the majority have finely granular protoplasm and well defined granular nuclei. There is slight variation in the size and depth of staining of the nuclei, but they all seem to belong to the same type of cell. No oxyphil cells are seen.

Pancreas There is considerable interstitial fibrosis and the ducts are surrounded by fibrous tissue similar to the peribiliary fibrosis in the liver. There are many dilated lymphatics, some of which contain carbon pigment and lymph. The glandular acini and islets of Langerhans appear normal.



A part of Dr. Zimmerman's audience, assembled in the Speidel Hall of the Immortals, International Surgeons' Hall of Fame.

deals primarily with surgery. The others consist essentially of a jumble of prayers, incantations and fanciful prescriptions. This one describes a series of cases, logically arranged. The more superficial injuries are described first, followed by progressively more severe injuries. A definite style is followed in the presentation of each case: Each is headed, "Title," which usually begins with the words "Instructions concerning," and is followed by a designation of the type and location of the injury or disease, for example, "Instructions concerning a gaping wound in his head, penetrating to the bone and splitting his skull." This in turn is followed by the heading, "Examination," which includes a record of the interrogation of the patient, inspection, palpation and observation of movements executed at the direction of the surgeon. These clinical features are the basis on which the "Diagnosis" is reached, and that usually opens with the words, "Thou shouldst say concerning him." A description of the ailment follows, and included is the "Verdict," a statement of the surgeon's decision regarding treatment. He may pronounce any of the following judgments:

1. "An ailment with which I will treat." (This he considers curable.)

2. "An ailment with which I will contend." (Thus he records his doubts about the curability, nevertheless instituting his therapeutic measures.)

3. "An ailment not to be treated." (With this verdict he emphasizes the seriousness of the case, thereby relieving himself of personal responsibility in the event of a fatal outcome. He refrains from immediate therapy, and restricts himself to watchful waiting and thorough observation of the patient. The inclusion of these cases, even though they are not to be treated, bespeaks a scientific interest in placing them on record.)

The final section in each case deals with "Treatment." Included in it are mechanical, medicinal, postural and dietary instructions.

The material in this textbook consists of 48 surgical cases, most of which result from injuries. Included are: wounds of the head, 27 cases; injuries of the throat and neck, 6 cases; injuries of the clavicle, 2 cases; injuries of the humerus, 3 cases; injuries of the chest and breast, 8 cases; injuries of the shoulders, 1 case, and injuries of the thoracic portion of the spine, 1 incomplete case.

The book offers us a glimpse of the state of scientific knowledge in that period. The primitive anatomic observations are re-

places it is distended by calcium deposit. At the bifurcation of a tertiary branch the artery shows slight fibrosis of the media, and complete deficiency of the media over the point of the cleft, the gap being filled up by the connective and elastic tissue of the adventitia. The internal elastic lamina continues over the point but stains very poorly (fig 9). There is no intimal hypertrophy and no pouching at this weak spot, but a chance section through a branch junction further along shows a minute dilatation where the media is deficient (fig 10). The pouch is not in the centre of the bifurcation, but at the junction of the lateral wall of the branch and the parent artery, a situation also observed by others to be liable to deficiency of media with dilatation. Section through one of the visible aneurysms shows fairly advanced arteriosclerosis with calcification of the elastic lamina.

Liver There are fibrous dilated veins and dilated capillaries under the capsule corresponding with the naked-eye appearance. Thick strands of fibrous tissue penetrate inwards for a short distance without any small-cell infiltration. There is no general cirrhosis but there is an increase of fibrous tissue at the portal junctions, especially near the surface, which appears as islands in the sections. The most striking arrangement of fibrous tissue is the encirclement of the bile ducts, the ducts themselves appear healthy, without inflammation, dilatation or proliferation. The parenchyma is much congested, with extensive fatty change, vacuolation and the deposition of brown, non-iron-reacting pigment granules.

Kidneys Interstitial fibrosis is the chief feature. A few scattered glomeruli are fibrous. There are a few minute deposits of calcium in the tubules. No arterial changes. The main renal artery shows a little degeneration of the internal elastic lamina with a deposit of fine calcium granules.

Right superior parathyroid The size of the organ is mainly due to increase of fatty tissue which, in places, separates the acinar tissue into small islets. Capillary vessels are numerous and can be seen in close conjunction with the gland acini. The latter are composed of chief cells in solid groups or set round a lumen containing slightly acidophil colloid, these vesicles are more numerous than usual. Some of the cells are foamy with no visible nucleus, but the majority have finely granular protoplasm and well defined granular nuclei. There is slight variation in the size and depth of staining of the nuclei, but they all seem to belong to the same type of cell. No oxyphil cells are seen.

Pancreas There is considerable interstitial fibrosis and the ducts are surrounded by fibrous tissue similar to the peribiliary fibrosis in the liver. There are many dilated lymphatics, some of which contain carbon pigment and lymph. The glandular acini and islets of Langerhans appear normal.

ing it; his flesh has received wind; his two eyes are blood-shot; it is a dislocation of a vertebra of his neck extending to his backbone which causes him to be unconscious of his two arms and his two legs. If, however, the middle vertebra of his neck is dislocated it is an emissio seminis which befalls his phallus.

DIAGNOSIS

Thou shouldst say concerning him: "One having a dislocation in a vertebra of his neck, while he is unconscious of his two legs and his two arms, and his urine dribbles. An ailment not to be treated.

Gloss A

As for: "A dislocation (*wnh*) in a vertebra of his neck," he is speaking of a

separation of one vertebra of his neck from another, the flesh which is over it being uninjured; as one says, "It is *wnh*," concerning things which had been joined together, when one has been severed from another.

Gloss B

As for: "It is an emissio seminis which befalls his phallus," it means that his phallus is erected and has a discharge from the end of his phallus. It is said: "It remains stationary" (*mn s'w*) when it cannot sink downward and it cannot lift upward.

Gloss C

As for: "While his urine dribbles," it means that urine drops from his phallus and cannot hold back for him.

IMPORTANT NOTICE TO ALL CONGRESS PARTICIPANTS

Those desiring their Congress presentations to appear later as articles in the Journal of the International College of Surgeons, please note:

1. A full copy of the manuscript, together with all illustrations, legends, tabular matter and bibliographic references, should be sent DIRECT to the Editorial Office, Journal of the International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois. Manuscripts so submitted will be promptly acknowledged and, on acceptance by the Editorial Board, published as soon after the Congress as possible. The Journal cannot be held responsible for loss, failure of acknowledgment, delay in publication or nonpublication of any manuscript, or any subsidiary material appertaining thereto, which has not been submitted through the official editorial channels.

2. Manuscripts may be submitted in advance of the Congress if desired. When this is done, they should be plainly marked with the name, place and date of the Congress concerned, to guard against premature publication.

3. Manuscripts delivered in person to Congress officials or others for press reportorial use only should be sent by the recipient to the Public Relations Bureau.

These requests are made not only to safeguard the Journal from error but in the best interests of our contributors. To make sure of prompt acknowledgment and efficient handling of your Congress presentation, please send it DIRECT to its ultimate destination!

ROSTER OF REGENTS OF THE UNITED STATES SECTION International College of Surgeons 1956-1958

CHAIRMAN OF BOARD

Ralph Ringo Coffey, M.D., F.A.C.S., F.I.C.S.
1103 Grand Avenue, Kansas City 6, Missouri
Diplomate, American Board of Surgery

ALABAMA

James Orville Morgan, M.D., F.A.C.S., F.I.C.S.
303 Phillips Bldg., Gadsden
Diplomate, American Board of Surgery

ARIZONA

Joseph Madison Greer, M.D., F.A.C.S., F.I.C.S.
15 East Monroe Street, Phoenix
Diplomate, American Board of Surgery

ARKANSAS

David Harvey Shipp, M.D., F.A.C.S., F.I.C.S.
1031 Donaghey Building, Little Rock
NORTHERN CALIFORNIA

Lester J. Johnson, M.D., F.I.C.S.
626 East Santa Clara Street, San Jose 12
Diplomate, American Board of Proctology

SOUTHERN CALIFORNIA

Joseph Manuel de los Reyes, M.D., F.A.C.S.,
F.I.C.S.
2010 Wilshire Boulevard, Los Angeles 5
COLORADO

Kenneth Charles Sawyer, M.D., F.A.C.S., F.I.C.S.
1839 High Street, Denver 2
Diplomate, American Board of Surgery

CONNECTICUT

Anthony J. Mendillo, * M.D., F.A.C.S., F.I.C.S.
45 Trumbull Street, New Haven 10
Diplomate, American Board of Surgery

DELAWARE

Raymond Addison Lynch, M.D., F.I.C.S.
619 Delaware Avenue, Wilmington 9
DISTRICT OF COLUMBIA

James Winston Watts, M.D., F.A.C.S., F.I.C.S.
1911 "R" Street, N. W., Washington 9
Diplomate, American Board of Neurologic
Surgery

FLORIDA

Don C. Robertson, M.D., F.A.C.S., F.I.C.S.
1217 Kuhl Avenue, Orlando
Diplomate, American Board of Surgery

GEORGIA

Alva Hamblin Letton, M.D., F.A.C.S., F.I.C.S.
478 Peachtree Street, N. E., Atlanta
Diplomate, American Board of Surgery

IDAHO

Alfred Hugo Rossomando, * M.D., F.A.C.S.
F.I.C.S.
1003 Twelfth Avenue, South, Nampa

ILLINOIS

William Marcus McMillan, * M.D., F.A.C.S.
F.I.C.S.
122 South Michigan Avenue, Chicago 3
Diplomate, American Board of Surgery

INDIANA**

IOWA

Arthur Steindler, M.D., F.A.C.S., F.I.C.S.
Mercy Hospital, Iowa City
Diplomate, American Board of Orthopedic
Surgery

KANSAS

Willard Joyce Kiser, M.D., F.I.C.S.
209 East William Street, Wichita
Diplomate, American Board of Surgery

KENTUCKY

Joseph Andrew Bowen, M.D., F.A.C.S., F.I.C.S.
332 West Broadway, Louisville 2
Diplomate, American Board of Urology

LOUISIANA

Arthur Neal Owens, M.D., F.A.C.S., F.I.C.S.
2223 Carondelet Street, New Orleans
Diplomate, American Board of Plastic Surgery

MAINE

Joseph Hubert Giesen, * M.D., F.A.C.S., F.I.C.S.
Gilman Street, Waterville
Diplomate, American Board of Orthopedic
Surgery

MARYLAND

Edgar F. Berman, * M.D., F.A.C.S., F.I.C.S.
701 Cathedral Street, Baltimore 1
Diplomate, American Board of Surgery

MASSACHUSETTS

M. Leopold Brodny, M.D., F.A.C.S., F.I.C.S.
636 Beacon Street, Boston 15
Diplomate, American Board of Surgery

MICHIGAN

J. Duane Miller, M.D., F.A.C.S., F.I.C.S.
604 Metz Building, Grand Rapids 2
Diplomate, American Board of Surgery

MINNESOTA

Gershon J. Thompson, M.D., F.A.C.S., F.I.C.S.
Mayo Clinic, 102-110 Second Avenue, S. W.,
Rochester

Diplomate, American Board of Urology

MISSISSIPPI

Lawrence Wilburn Long, M.D., F.A.C.S., F.I.C.S.
777 North State Street, Jackson

MISSOURI

Claude Judson Hunt, M.D., F.A.C.S., F.I.C.S.
1612 Professional Bldg., Kansas City
Diplomate, American Board of Surgery

MONTANA

Louis William Allard, M.D., F.A.C.S., F.I.C.S.
217 Montana Power Bldg., Billings
Diplomate, American Board of Orthopedic
Surgery

NEBRASKA

Paul Herbert Thorough, M.D., F.I.C.S.
1027 Sharp Bldg., Lincoln 8
Diplomate, American Board of Surgery

*Newly appointed.

**Appointment to be announced.

BELGIAN SECTION

International College of Surgeons

One of the youngest national sections of the International College of Surgeons is the Belgian Section, which was formally admitted into membership in the College at the Tenth Biennial International Congress in Chicago in September. In a recent communication from Dr. F. A. Sondervorst, Secretary General of the Belgian Section, the induction of twelve new members as Fellows of the College was announced. The Section, which from its inception has drawn its members from all parts of Belgium, has enriched its representation with members from eight different cities and towns of the country. Admitted to Fellowship were the following candidates:

- Dr. René A. L. Neven of Leut par Eisden, Limbourg
- Dr. Georges J. G. Lambert of Tirlemont
- Dr. René J. H. M. Hubin of Huy

- Dr. André a. Arianoff of Brussels
- Dr. Edouard E. M. Nicolas of Huy
- Dr. Paul-Léopold Tallon of Geet-Betz
- Dr. Adhémar Dewulf of St. Gilles-Termonde

- Dr. Gustave Jacquemin of Huy
- Dr. B. Blankoff of Brussels
- Dr. Pierre E. G. Daubitz of Liege
- Dr. Louis A. E. Quinet of Cointe-Sclassin
- Dr. Maurice-Jean-André Wilmott of Liege

If one were to prognosticate on the growth potentials of the Belgian Section, one would predict that the Fellows who are in membership at the present time will comprise the nuclei around which the organization will expand. There being so many regions currently represented, the outlook for a strong Belgian Section is most promising.

SWISS SECTION

International College of Surgeons

Mr. Edwin Fawer, Administrative Secretary for Europe and the Middle East of the International College of Surgeons has sent word of the splendid work done by the surgeons of the Swiss Section of the College under the stimulus of its president Dr. Nicolet, in connection with the recent mine catastrophe that took place in Belgium. The Swiss Section donated an amount equivalent to \$500 for the relief of the victims and their families. Also, when the news of the tragic events taking place in Hungary began to seep through to the outer world, the Swiss surgeons again inspired by Dr. Nicolet, took immediate steps to decide how they could best extend aid for the relief of human suffering. Their decision was to send a team of members of the Swiss Section to Hungary, to render surgical and medical assistance to those Hungarians who so desperately needed skilled professional care. The Swiss team was packed and ready to leave Switzer-

land within twenty-four hours of the announcement of the revolts and fighting which had begun in Hungary. Their plan was to remain in Hungary for two weeks and lend their skills to the wounded and the ailing.

To match the humanitarian spirit which propelled our Swiss Fellows, a bus company placed transportation facilities at the disposal of the team without charge. In addition, a convoy of twenty trucks, loaded with medicaments and food supplies, representing an investment of thousands of dollars, was prepared to depart to the most beleaguered areas of the stricken land.

Swiss members of the International College of Surgeons were working hand in hand with the International Red Cross, the only agency authorized to have access to Hungary in its time of need through which all aid has

Telangiectases also occur in healthy subjects and in association with various chronic and acute diseases. These will not be discussed here, but figs 5, 6 and 7 illustrate three types. It is difficult to say whether there is new formation of vessels or not, as the localisation of capillary dilatation tends to give that appearance. At present the distinguishing marks of the disease lie more in the distribution of the telangiectases on the face and mucous membranes and in the involvement of venules than in the histological details.

Other vascular lesions

Fibrosis of veins with dilatation and distortion is present in the lungs and liver. (In the lungs there is also a localised phlebitis which may be associated with the terminal pulmonary infection.) I can find no other account of similar venous changes in the internal organs of telangiectatic patients. There are a few observations of subcutaneous varicose veins and hæmorrhoids in these cases and they might all be regarded as manifestations of a general weakness of the vascular system—what Parkes Weber would call a congenital-developmental vascular dysplasia and Schoen (1930) a hereditary constitutional dysplasia of the vein wall which becomes evident after puberty.

The aneurysms of the splenic artery may be another manifestation of inborn vascular defect. Anderson and Gray (1929-30) collected 58 cases of splenic aneurysms, twelve of which were multiple. Arteriosclerosis, syphilis and other infections accounted for some, but the authors definitely excluded all of these causes in a number of instances. Other arterial systems are subject to the same hazard of multiple aneurysmal dilatation, notably the cerebral (Fearnside, 1916, Weber and Bode, 1929, Forbus, 1930, Chase, 1932, and others), and the hepatic artery (Friedenwald and Tannenbaum (1923) collected 65 cases), the renal artery (Singer (1928) collected 45 cases) and the coronary arteries (Packard and Wechsler (1929) collected 31 cases but did not include a specimen shown by Bristowe in 1856). In all these collections there are certain inexplicable cases where the aneurysms might be regarded as having a congenital basis. The suggestion was originally made by Eppinger (1887) and has been especially worked out for the cerebral aneurysms, which are frequently multiple and situated at branch junctions. Though these are occasionally arteriosclerotic (e.g. Thorpe and Clegg's (1936) case) or mycotic (Collier, 1931), the majority have probably an anatomical and congenital basis, and Greenfield has observed a hereditary tendency. Microscopically there is always a deficiency of medial muscle at the branch junctions and aneurysms have been observed in all stages of development at this weak spot.



FOUNDED BY DR. MAX THOREK

The Journal of the International College of Surgeons

FOUNDED IN GENEVA, SWITZERLAND, 1935 - INCORPORATED IN WASHINGTON, D. C., 1940

Vol. XXVII

FEBRUARY, 1957

No. 2

General Surgery

The Complications, Sequelae, Prognosis and End Results of Operations on the Bile Passageways and the Pancreas

MOSES BEHREND, A.M., M.D., F.A.C.S., F.I.C.S. (Hon.), D.A.B.

PHILADELPHIA, PENNSYLVANIA

MANY of the sequelae and complications of cholecystic surgery can be prevented, as has been shown by Prof. Michels, by a profound knowledge of the normal anatomic picture and its variations with regard to the gallbladder and its ducts. Early in the twentieth century Eisendrath of Chicago was one of the pioneers in bringing these matters to the attention of surgeons and helped lead the way to research in this anatomic field. Not too much attention was paid to these ad-

monitions until a deluge of accidents to the common bile duct occurred. Curiously enough, more accidents occurred to the common duct in the United States than were encountered abroad. Ogilvie of England called the attention of the profession to the fact that there were fewer injuries to the common duct in Great Britain than in any other country. He explained this on the basis of the fact that British physicians were well versed in anatomy. Shortly after his paper appeared, however, the injury to the common duct of Prime Minister Eden was announced, as well as the jaundice that followed as a result. It is past history now that Eden was operated upon

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.
Submitted for publication Oct. 10, 1956.

Telangiectases also occur in healthy subjects and in association with various chronic and acute diseases. These will not be discussed here, but figs 5, 6 and 7 illustrate three types. It is difficult to say whether there is new formation of vessels or not, as the localisation of capillary dilatation tends to give that appearance. At present the distinguishing marks of the disease lie more in the distribution of the telangiectases on the face and mucous membranes and in the involvement of venules than in the histological details.

Other vascular lesions

Fibrosis of veins with dilatation and distortion is present in the lungs and liver. (In the lungs there is also a localised phlebitis which may be associated with the terminal pulmonary infection.) I can find no other account of similar venous changes in the internal organs of telangiectatic patients. There are a few observations of subcutaneous varicose veins and hæmorrhoids in these cases and they might all be regarded as manifestations of a general weakness of the vascular system—what Parkes Weber would call a congenital-developmental vascular dysplasia and Schoen (1930) a hereditary constitutional dysplasia of the vein wall which becomes evident after puberty.

The aneurysms of the splenic artery may be another manifestation of inborn vascular defect. Anderson and Gray (1929-30) collected 58 cases of splenic aneurysms, twelve of which were multiple. Arteriosclerosis, syphilis and other infections accounted for some, but the authors definitely excluded all of these causes in a number of instances. Other arterial systems are subject to the same hazard of multiple aneurysmal dilatation, notably the cerebral (Fearnside, 1916, Weber and Bode, 1929, Forbus, 1930, Chase, 1932, and others), and the hepatic artery (Friedenwald and Tannenbaum (1923) collected 65 cases), the renal artery (Singer (1928) collected 45 cases) and the coronary arteries (Packard and Wechsler (1929) collected 31 cases but did not include a specimen shown by Bristowe in 1856). In all these collections there are certain inexplicable cases where the aneurysms might be regarded as having a congenital basis. The suggestion was originally made by Eppinger (1887) and has been especially worked out for the cerebral aneurysms, which are frequently multiple and situated at branch junctions. Though these are occasionally arteriosclerotic (e.g. Thorpe and Clegg's (1936) case) or mycotic (Collier, 1931), the majority have probably an anatomical and congenital basis, and Greenfield has observed a hereditary tendency. Microscopically there is always a deficiency of medial muscle at the branch junctions and aneurysms have been observed in all stages of development at this weak spot.

destroyed duct can be dissected out. Turning up of the duodenum and dissecting out the distal portion of the common duct is a valuable part of the technic. If possible, it is much better to perform an end-to-end anastomosis without the intervention of any foreign tube or material.

Stricture of the Common Duct. — The most important factor in prevention of stricture to the common duct is, as has been stated, a thorough knowledge of the ductal anatomic picture and the anomalies that may occur in these structures. It has been stated by some that use of the T tube for drainage is one cause of stricture of the common duct. My service has been using the T tube for the past fifty years, and it has not been responsible for a stricture at any time. As a matter of fact, a number of strictures operated upon have been due to ligation of the common duct and a ligature around the cystic duct, placed too close to the common duct.

The various operations for the repair of strictures and destruction of the common duct have been mentioned.

Acute Cholecystitis (Acute Emphyema).

—This is a controversial subject. It is considered here because perforation in some clinics occurs frequently when medical treatment is employed. The main cause of these perforations is that the patients are fed as usual; starvation is the only method by which perforation can be avoided. If the patient is fed parenterally, the acute symptoms will subside within twelve hours and will remain in subsidence as long as the starvation diet is maintained. The optimal to operate for acute cholecystitis is after the acute symptoms have subsided. Recently Doubilet and Mulholland, and in addition, Pearce, have supported this regime, which may take two, three or four days after the attack. As a result of this waiting period I have encountered gall-bladders that were gangrenous in patches, but it demonstrated that the starvation

treatment will prevent perforation.

Cholecystectomy is always performed in such cases, provided the surgeon has waited long enough to allow the subsidence of symptoms. Cholecystostomy is a rare operation in my service. It is performed only when the patient has reached the seventh decade of life or when there are signs of perforation of the gallbladder that can be detected by an extreme tenderness in the right hypochondriac region.

One should never hesitate to operate for these acute conditions if the symptoms do not subside within twenty-four to forty-eight hours. A high gangrenous ruptured appendix and acute pancreatitis may simulate the symptoms of acute cholecystitis.

The morbidity and mortality rate of acute cholecystitis can be reduced by not operating on an emergency basis. Many years ago, when this was done, deaths occurred frequently because the operation was done too soon. The toxins of inflammation seemed to spread rapidly, and within twenty-four hours the patient died. Since waiting for the subsidence of symptoms has been the rule, the death rate has been 1 per cent.

Cholelithiasis vs. Coronary Cardiac Disease.

—It has been known for many years that there is a definite connection between chronic disease of the gallbladder and myocardial changes with occlusion of the coronary arteries. It is most difficult sometimes to separate the two. They may also be concomitant. Roentgen and electrocardiographic studies will usually clarify the situation. Patients whose condition has been definitely diagnosed as coronary thrombosis have been relieved of their symptoms, and some, apparently, have been cured. Perhaps there is a focal infection that must be considered when these two conditions exist coincidentally. In several cases in which operation was performed here there has been no recurrence of cardiac symptoms.

Telangiectases also occur in healthy subjects and in association with various chronic and acute diseases. These will not be discussed here, but figs 5, 6 and 7 illustrate three types. It is difficult to say whether there is new formation of vessels or not, as the localisation of capillary dilatation tends to give that appearance. At present the distinguishing marks of the disease lie more in the distribution of the telangiectases on the face and mucous membranes and in the involvement of venules than in the histological details.

Other vascular lesions

Fibrosis of veins with dilatation and distortion is present in the lungs and liver. (In the lungs there is also a localised phlebitis which may be associated with the terminal pulmonary infection.) I can find no other account of similar venous changes in the internal organs of telangiectatic patients. There are a few observations of subcutaneous varicose veins and hæmorrhoids in these cases and they might all be regarded as manifestations of a general weakness of the vascular system—what Parkes Weber would call a congenital-developmental vascular dysplasia and Schoen (1930) a hereditary constitutional dysplasia of the vein wall which becomes evident after puberty.

The aneurysms of the splenic artery may be another manifestation of inborn vascular defect. Anderson and Gray (1929-30) collected 58 cases of splenic aneurysms, twelve of which were multiple. Arteriosclerosis, syphilis and other infections accounted for some, but the authors definitely excluded all of these causes in a number of instances. Other arterial systems are subject to the same hazard of multiple aneurysmal dilatation, notably the cerebral (Fearnside, 1916, Weber and Bode, 1929, Forbus, 1930, Chase, 1932, and others), and the hepatic artery (Friedenwald and Tannenbaum (1923) collected 65 cases), the renal artery (Singer (1928) collected 45 cases) and the coronary arteries (Packard and Wechsler (1929) collected 31 cases but did not include a specimen shown by Bristowe in 1856). In all these collections there are certain inexplicable cases where the aneurysms might be regarded as having a congenital basis. The suggestion was originally made by Eppinger (1887) and has been especially worked out for the cerebral aneurysms, which are frequently multiple and situated at branch junctions. Though these are occasionally arteriosclerotic (e.g. Thorpe and Clegg's (1936) case) or mycotic (Collier, 1931), the majority have probably an anatomical and congenital basis, and Greenfield has observed a hereditary tendency. Microscopically there is always a deficiency of medial muscle at the branch junctions and aneurysms have been observed in all stages of development at this weak spot.

cissement n'est jamais imputable au tube en T; il est dû, dans la majorité des cas, à des erreurs de techniques opératoires.

20. La perforation de la vésicule biliaire est une complication rare, à condition que le patient soit soumis à un régime affamant durant la crise aiguë.

21. Avant d'opérer il faut, autant que possible, attendre la fin des symptômes aigus. Une opération d'urgence est nécessaire dans 2% des cas environ.

22. Il arrive souvent que l'on confonde des symptômes de cholélithiasie avec ceux d'une affection coronarienne. Le diagnostic différentiel est en général possible grâce à un radiogramme et à un électrocardiogramme.

23. La "mort hépatique" était autrefois une complication redoutée. Elle est aujourd'hui pratiquement éliminée, grâce à une meilleure préparation et à une technique perfectionnée.

24. La pancréatite aiguë est une affection très douloureuse, mais elle ne justifie pas une opération d'urgence.

25. La ligature accidentelle de l'artère hépatique est une complication grave, toujours mortelle.

26. Le carcinome des voies biliaires représente environ 6% des cas. Le cancer du pancréas atteint un pourcentage élevé.

SCHLUSSEFOLGERUNGEN

1. Zur Erzielung der bestmöglichen postoperativen Ergebnisse ist eine genaue Kenntnis der Anatomie und Physiologie der Leber, der Bauchspeicheldrüse und der Gallenwege von Wichtigkeit.

2. Wenn auch die Ausführung von Leberfunktionsprüfungen in manchen Kliniken regelmässig ausgeführt werden, so ist doch die Bestimmung der Prothrombinzeit die wichtigste Untersuchung.

3. Die Funktionsprüfungen sind hilfreich in der Unterscheidung von Hepatitis und Obstruktionsgelbsucht.

4. Eine vollständige Blutuntersuchung einschliesslich chemischer Analyse und Zentrifugierung sollte stets ausgeführt werden.

5. Bluttransfusionen sollten vorgenommen werden, wenn eine Indikation vorliegt, besonders in Fällen von Gelbsucht.

6. Das Vitamin K ist das spezifische Mittel zur Verhütung von Blutungen bei ikterischen Kranken.

7. Antibiotika sollten vor der Operation in Fällen akuter Erkrankung und nach der Operation in jedem Fall verabreicht werden. Penizillin ist ein spezifisches Mittel gegen Infektionen mit Clostridium Welchii.

8. Von Gallenblasenresektionen ohne das Vorliegen von Gallensteinen sollte abgeraten werden. Die Operation führt nicht zur Heilung.

9. Dem Zurücklassen eines grösseren Abschnittes des Gallenblasenganges ist grosse Bedeutung als Ursache späterer Krankheiterscheinungen zugeschrieben worden. Dies ist jedoch nicht so wichtig, weil man gewöhnlich einen zurückgebliebenen Stein findet.

10. Als Technik der Gallenblasenresektion sollte ein als "offene Methode" bekanntes Verfahren angewandt werden.

11. Die Gallenblasenresektion kann von unten nach oben oder in umgekehrter Richtung ausgeführt werden. Der Verfasser bevorzugt ein Vorgehen von oben nach unten, obgleich es Zustände gibt, die eine Operation in umgekehrter Richtung ratsam erscheinen lassen.

12. Eine Drainierung des Operationsgebietes wird fast allgemein durchgeführt. Wenn das Operationsfeld trocken ist, erübrigt sich die Drainierung.

13. Subhepatische und subphrenische Exudate scheinen bei Anwendung der Drainierung häufiger vorzukommen, als wenn man auf sie verzichtet.

14. Dyskinesie nach Gallenblasenresektionen führt zu lästigen Krankheiterscheinungen.

liver as exemplified by their patient, whose mother has the same syndrome and is still alive

The liver in my case presents quite a different picture of insular portal fibrosis free from cell invasion, with in addition peribiliary localisation, a rare condition. According to Parkes Weber (1902-3) it is sometimes seen in the liver of patients with congenital cystic kidney, even though the liver itself is not macroscopically cystic, and he considers this to be evidence in favour of a congenital dysplasia of the liver in the present instance.

The presence of an enlarged parathyroid in the absence of its fellow of the same side cannot be regarded as significant, and it would be unwise without more evidence to attribute the deposits of calcium in the kidney and in the renal and splenic arteries to abnormal parathyroid function.

The prolonged anæmia and rheumatic fever would account for the changes in the other organs, or they might be taken in a general way to support Gjessing's theory that toxins as well as heredity play a part in the genesis of the disease.

SUMMARY

1 An account of a case of hæmorrhagic telangiectasia of the familial type is given, with full necropsy report. There is so little in the literature with which to compare it that it is impossible to say whether all the lesions present pertained to the disease or whether some of them were not independent phenomena.

2 The telangiectases are considered to have no special structure which distinguishes them from telangiectases occurring in other pathological states.

3 Abnormalities of arteries and veins as well as capillaries were found in the patient, and it is suggested that they are all "congenital-developmental" defects.

4 The histology and ætiology of multiple splenic aneurysms are briefly discussed.

I am much indebted to Dr Saxby Wills for giving me a full clinical history of the case. I have pleasure also in acknowledging with grateful thanks the abundant help given me by Dr Parkes Weber throughout the investigation. I am indebted to Mr A. Griffin for the microphotographs.

REFERENCES TO FAMILIAL TELANGIECTASIA

- | | |
|---------------------|---|
| BALLANTYNE, A J | <i>Glasg Med J</i> , 1908, lxx 256 |
| VAN BOGAERT, L, AND | <i>Ann Méd</i> , 1935, xxxviii 290 |
| SCHERER, J H | |
| BOSTON, L N | <i>Amer J Med Sci</i> , 1930, clxxx 798 |
| COCKAYNE, E A | Inherited abnormalities of the skin, London, 1933 |
| CURTIS, F | <i>Klin Wschr</i> , 1928, vii 2141 |

titis, *Postgraduate Med.* 2:341-345 (Nov.) 1947.
 Acute Cholecystitis: Preoperative Treatment,
J. Internat. Coll. Surgeons 13:649-650 (May) 1950.
 Choice of Procedure in Acute Choleystitis (Editorial),
Am. J. Surg. 79:753-754 (June) 1950.
 Diseases of the Gallbladder and Allied Structures:
 Diagnosis and Treatment. Philadelphia: F. A. Davis Company, 1947.

Behrend, M.; Radasch, H. E., and Kershner,

A. G.: Comparative Results of the Ligation of the Hepatic Artery, *Arch. Surg.* 4:661-679 (May) 1922.

Behrend, M., and Behrend, A.: Common Bile Duct: Anatomy, Physiology and Surgery, *J. Internat. Coll. Surgeons* 10:378-380 (July-Aug.) 1947.
 Chronic Pancreatitis Causing Complete and Incomplete Obstruction of the Common Bile Duct, *Arch. Surg.* 57:51-61 (July) 1948.

. . . The experience afforded in an hospital will keep down the luxuriance of plausible theories. Many such have been delivered in lectures by celebrated teachers, with great applause; but the students, though perfectly masters of them, not having corrected them with what nature exhibits in an hospital, have found themselves more at a loss in the cure of a patient than an elder apprentice of an apothecary.

It is true that the scientific value of an observation usually increases with its generality. But unique facts may also possess profound scientific significance. Take Tycho Brahe's discovery of a nova, a new fixed star, in 1572, or the synthesis of urea by Wöhler in 1828. The great scientific value of these discoveries lay in the fact that they fundamentally changed our conception about the nature of things. The birth of Tycho's new star proved that the empyrean was subject to change. Its occurrence invaded the last area of the universe still reserved to the rule of divine principles and annexed it to the realm of accident and necessity: a fit subject of empirical science. By this discovery Tycho anticipated Newton's demonstration that the same laws governed the stars in their courses and the swing of a clock's pendulum. Similarly, Wöhler by his synthesis of urea broke through the barrier between the inanimate and the living. He proved that no "life-force" was required for the production of organic matter, and thus opened the path to biochemistry.

Discoveries like those of Tycho or Wöhler are valued for the breadth of their implications, even though they establish no new general laws. They offer something more vague and also more profound: namely, a truer understanding of a large domain of experience. Generality is indeed but an aspect of profundity in science, and profundity itself, . . . but an expression of the feeling that we are making a new, more intimate, contact with reality.

—Polanyi

oder diätetische Faktoren eine Rolle spielen.

CONCLUSIONI

Il pericolo della tromboembolia sembra meno grave in Grecia che altrove. La sua frequenza è aumentata notevolmente dopo i tagli cesarei. Non pare che l'impiego degli antibiotici abbia alcun effetto sull'incidenza della trombosi.

Se questa osservazione sulla tromboembolia in Grecia sarà confermata anche nel futuro, si dovranno ricercare i fattori climatici o dietetici responsabili.

CONCLUSIONS

La fréquence de la thrombo-embolie semble être moins élevée en Grèce qu'ailleurs. Il a été constaté qu'elle augmente après une césarienne. Ce fait constitue un facteur de plus confirmant l'auteur dans sa théorie selon laquelle 4) il faut éviter de prendre trop souvent la décision hâtive de résoudre tous les problèmes d'obstétrique par la césarienne. L'emploi des antibiotiques ne semble pas avoir eu d'effet sur l'incidence de la thrombose.

Si cette théorie de la moins grande fréquence des thrombo-phlébites en Grèce devait se confirmer, il resterait encore à déterminer si les facteurs climatiques ou diététiques jouent un rôle.

CONCLUSOES

Na Grecia o perigo da trombose de modo geral parece menor que alhures. A frequência é muito grande após as cesarianas.

Há um fator adicional que reforça a opinião do A. e que é a ausência de indicações precipitadas para solver as situações obstétricas sempre pela cesariana. O uso de antibióticos não parece ter influido na incidência das tromboembolias.

Caso essa teoria de tromboflebite na Grecia seja confirmada futuramente é preciso determinar a possível influência de fatores climáticos ou dietéticos.

CONCLUSIONES

En Grecia, el peligro de las tromboembolias parece ser en general menos agudo que en otras partes. Su frecuencia aumenta notablemente después de las cesáreas. Este es un factor más que refuerza la teoría del autor de que no debe haber una decisión precipitada para resolver todos los problemas obstétricos por medio de esta operación.

El uso de los antibióticos no parece haber tenido efecto alguno en la incidencia de la trombosis.

Si esta teoría de la tromboflebitis en Grecia se confirma en el futuro, todavía queda por determinar si hay factores climáticos ó dietéticos envueltos en el problema.

REFERENCES

1. Hauser, A., and Troester, R.: *Thrombosis and Embolism*. Basel: Benno Schwabe, 1954. P. 457.
2. Rehm, E.: *ibid.* pp. 522 and 523.
3. Werthemann, A. and Rutishauser, G.: *ibid.* p. 527-529.
4. Papatheodorou, T.: *Elliniki Iatriki* 9:849, 1953.
5. Travlos, D. N.: *Tendances actuelles en Gynécologie et Obstétrique*. Geneva: Georg et Cie, 1955, p. 743.

Some generality of understanding is the essence of civilized culture, and is a crying need in medicine and we must seek it earnestly if we are not to decline to the level of craftsmen and technicians.

—Walsh

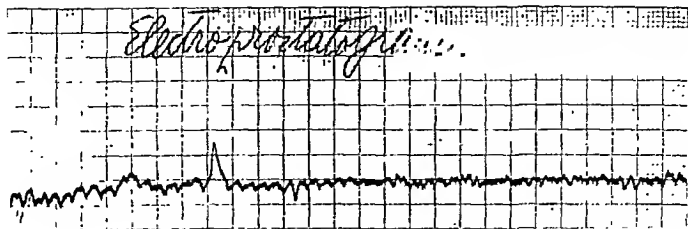


Fig. 4.—Electroprostatogram of dog.

cases, however, the sensitivity has to be increased. It is advisable to register the renal potentials for half an hour, especially if the kidney fails to "write" at the beginning or if it stops writing shortly after the registration begins.

What happens if there is no registration? If the machine is in good working order and all conditions for registration fulfilled correctly, only the discontinuous production of currents is to be blamed for failure of registration. In such cases it is advisable to leave the needles in place, stop the machine, and after about ten minutes start anew with the registration. Figure 3 shows the arrangement of active and

inactive electrodes for the registration of renal potentials.

3. *The Prostate Gland* (Fig. 4): In animal experiments the prostate gland must be exposed surgically; clinical work on human beings is still in the experimental stage. It is too early, therefore, to describe a definite technic.

4. *The Testicles*; Concerning the technic of testicular registration of the testicles (electro-orchidograms), two suction cups are placed on the testicle and the inactive electrodes somewhere in the area of the symphysis, but away from the large vessels (Fig. 5). Needles are not to be used, lest the organ be traumatized. Because of the small size of the organ, infant suction cups are preferred. Again both organs, the healthy and the diseased, can be registered simultaneously; similarly, both testicles can be seen from Figure 6.

The curves show great variations, as can be seen from Figure 6. Figure 6A shows the result with a sexually active man; Figure 6B, that of a sexually inactive man. It is important, therefore, to take the history of the patient with regard to sexual activity, as well as the date of his last emission before the curves are registered.

5. *Body Fluids and Tissue Cultures*: For tissue cultures, suction cups are used. They are placed on agar surfaces in the Petri dishes in which cultures are grown. For



Fig. 5.—Electro-orchidographic technic.

is intended primarily to describe the pathological features of a post-mortem specimen which came into our possession

Clinical history

W P, aged 57, a married man, a farmer, was admitted to the West End Hospital for Diseases of the Nervous System, on 7/12/33, under the care of one of us (C W D), complaining of weakness of the right arm and leg

Present illness Eight months prior to admission, when riding his bicycle, he fell for no apparent reason. He did not remember falling, but recalled riding along the road on which the accident happened. After this his mind was a blank until, some three or four hours later, he "found himself in bed," vomiting and with the right side of the body partially paralysed. He then became aware of a left sided headache beginning in the temporal region and spreading over the vertex. This persisted intermittently and tended to get worse. The paralysis became more complete and was associated with a feeling of stiffness in the fingers of the right hand and of tingling in the right leg. For the first few weeks after the fall, he constantly saw double. No further vomiting occurred.

Past history No previous headaches. Four years prior to admission he had an operation for removal of gallstones. A year and a half previously had slipped off a ladder and fractured a rib.

Condition on admission A healthy looking man with nothing in his appearance to suggest pituitary or other endocrine disturbance. Weight 10 stone 5½ lb. Apyrexial. Pulse rate 80, respirations 20. Heart and lungs healthy. Blood pressure 130/70. Walked in a hemiplegic manner, dragging the right foot.

Slight ptosis of left eyelid. Pupils central and circular, left dilated. Reactions to light and on accommodation sluggish in both eyes, particularly the left. Vision right eye, D 12, left, D 18. Visual fields, fundi and ocular muscles normal. No nystagmus. Hearing normal, and functions of remaining cranial nerves unimpaired.

Upper limbs weakness of right arm with increase of tone in extensor muscles and exaggeration of the supinator and biceps jerks, triceps jerks equal.

Lower limbs weakness of all movements of right leg with hypertonia and exaggerated knee jerk, right ankle clonus, plantar reflexes right extensor, left flexor.

Abdominal reflexes diminished on right side.

Sensation impairment of common sensation, deep pressure and vibration sense in right arm, right leg and right half of trunk, co ordination fair.

Urine normal except for faint trace of albumin.

Cerebro spinal fluid (obtained by lumbar puncture) clear and colourless, with no clot on standing, two small lymphocytes per c.mm, total protein 0.03 per cent, globulin no excess, Lange's colloidal gold curve 0011100000, Wassermann and Kahn reactions negative.

Blood Wassermann reaction positive, with deviation of 7 m h d of complement, Kahn reaction positive, leucocytes 12,200 (polymorphs 68 per cent), blood urea 38 per cent, urea concentration factor 39.5.

Skiagram of skull (12/12/33) no evidence of fracture, the anterior vascular markings and Pacchionian depressions are pronounced, region of sella turcica appears normal.

Progress In view of the positive blood Wassermann, a course of novarsenobenzol was given and the patient was discharged from hospital on 22/12/33.

hantes a tomada do E.C.G. Em 1953 ele comunicou que registrou potenciais do parênquima renal e em 1956 conseguiu registrar os das suprarrenais, da próstata e dos testículos como também de cultura de tecidos, esperma e amostras de urina nas quais estavam presentes células epiteliais, eritrócitos e leucócitos em quantidade suficiente para produzir cargas elétricas. Descreve a técnica.

Os resultados dos trabalhos experimentais feitos em animais, do ponto de vista biológico e urológico, foram transferidos para a experiência clínica. Na opinião do A. os eletrogramas abrem caminho a tais investigações até então impraticáveis e poderão resultar em novos métodos de tratamento de doenças uro-genitais, esterilidade e afecções similares, assim como estudos de patologia em outros sectores.

RESUMEN

Por algunos años, el autor se ha interesado en explorar los potenciales de otras

estructuras aparte del carazón, en respuesta a procedimientos de investigación similares a la toma de un electrocardiograma. En 1953 él reportó haber registrado potenciales del parénquima renal y en 1956, tuvo éxito registrando potenciales de las glándulas suprarrenales, la próstata y los testículos, así como de tejidos en cultivo, semen y especímenes de orina con células epiteliales, eritrocitos y leucocitos en suficiente cantidad para producir corriente eléctrica. Su técnica se describe. Tanto los datos biológicos como urológicos han resultado de trabajo experimental en animales y de experiencias clínicas con pacientes humanos. En la opinión del autor, los electrogramas preparan el camino para nuevas investigaciones, no posibles hasta ahora, y conducirán a nuevos métodos en el manejo de enfermedades genito-urinarias, esterilidad y condiciones similares, así como en nuevas vías de acceso tanto fisiológicas como patológicas hacia enfermedades en otros campos.

In the year of our lord 1536, Francis, the French King, sent a puissant army beyond the Alps. In with all sort of weapons, but chiefly with bullets. I will tell the truth, I was not very expert at that time in matters of Chirurgie. . . . I observed and saw that all the Chirurgions used that method of dressing which Vigo prescribes: that they filled, as full as they could, the wounds made by gunshot with tents and pledgets dipped in scalding oyle at the first dressing. . . .

—*Paré*

more or less centrally, with a well defined nucleolus which varies considerably in both size and position. In a few of the nuclei there are two and very occasionally three nucleoli. The nucleus is of a clear vesicular type with a tendency towards peripheral distribution of the chromatin. As the physaliphorous process supervenes and progresses in the cell body (figs 7, 8 and 9) there is not infrequently a tendency to the occurrence of vacuolar change in the nucleus, giving rise to the appearance of a localised or patchy form of karyolysis. The boundary of these intranuclear vacuoles is sometimes sharp and distinct (fig 9), but is more usually indistinct, gradually merging with the breaking-down nuclear network. Mitoses are very rare, but occasionally two fully formed nuclei are to be seen in the same cell.

In the smaller, younger and less degenerated cells, the cytoplasm is finely reticular (fig 7). As the physaliphorous degeneration becomes established, the cytoplasm tends first to become foam-like on account of an accumulation of mucinoid material. These smaller spaces then tend to coalesce, or at all events one vacuole often becomes enlarged at the expense of its fellows. By the formation of these spaces the nucleus and surviving cytoplasm may become displaced to one side (figs 7 and 8). Some of the cells break up but the nucleus, surrounded only by a narrow ragged zone of cytoplasm, may survive. In a considerable proportion of the cells undergoing this more extreme degree of vacuolation, the nucleus, embedded in a narrow crescentic mass of condensed and deeply staining cytoplasm, is pushed to one side and the rest of the circumference of the cell around the large vacuole completed by a narrow linear band, producing a characteristic signet-ring appearance. In paraffin sections, many circular or slightly oval and apparently empty spaces are seen, the nuclei and surviving cytoplasm of the corresponding cells being out of the plane of section, so that the general appearance has become one of coarse vacuolation of the matrix (figs 6 and 10). As the degenerative process progresses, the cytoplasm disintegrates and disappears, giving the appearance of nuclei lying free in the mucinous material. Eventually, in some areas, the nuclei too completely disappear, leaving only large "lakes" (fig 4) of homogeneous or foamy material formed by the complete coalescence of mucinous droplets. In some areas where they have not coalesced, the vacuolar spaces are so numerous as to simulate fatty tissue, or one might, for descriptive purposes, liken the appearance to that of fatty bone-marrow undergoing gelatinous degeneration (fig 6). When stained with Mayer's mucicarmine, the matrix in many places and in varying degree takes on a diffuse pale pink, sometimes with darker pinkish-red patches.

The tumour is arranged in nodules of various sizes which tend

ment over each disc interspace enter the dorsal sensory roots two segments above. Abnormal tension in this ligament at the level of an unstable joint is another source of pain, and particularly when there is posterior protrusion of the disc.

Operative Technic. — The instruments used and the surgical procedure followed in doing intervertebral body fusion were described by Wiltberger⁴ in 1953.

The instruments used in this procedure are a broad nerve root retractor, a 5/8-inch hole saw with a retractable stilet, a 5/8-inch drill and guard sleeve, a 5/8-inch guard sleeve alone, a 1/2-inch hole saw, a 1/2-inch drill and guard sleeve alone, a tampon, a brace and a vertebra spreader. The 1/2-inch dowel graft is large enough for most intervertebral spaces. One seldom encounters a patient so large that the width of the intervertebral spaces would require the use of a 5/8-inch dowel.

Although it is agreed by most surgeons that the intervertebral body fusion is ideal, considered from a mechanical point of view, many consider the operative technic too difficult and not without hazard. For this reason Wiltberger attempted to perfect a simple body-to-body fusion. Although this is simpler, it too is not without hazards, the chief one being that the nerve root must be completely retracted medially before the guard sleeve is introduced between the laminae. The dowel type of intervertebral body fusion depends in principle on making standard size drill holes, for example, 1/2 inch in diameter between the vertebral bodies across the intervertebral disc space, and in inserting into these holes standard, pre-cut dowels of autogenous or homogenous bone that are 1/2 inch in diameter.

My preference is for autogenous cancellous bone procured from a posterior-superior iliac spine. First, an incision 3 or 4 inches (7.6 to 10.1 cm.) long is made over the spine, and two or more dowels of can-

cellous bone are cut out with the 1/2-inch hole saw. The dowels are 3/4 to 1 inch (1.9 to 2.5 cm.) long. The muscles in this wound are closed with black silk or No. 1 chromic catgut sutures as preferred, and the skin is closed with sutures of black silk.

After separation of the muscles from the spines and laminae of the lumbosacral region, a routine bilateral, interlaminar exposure is done by rongeur away a portion of the lamina above and below on both sides to a diameter of 3/4 inch. The vertebral bodies are distracted by cutting away the interspinous processes. Two transverse incisions are made in the posterior longitudinal ligament at the upper and lower borders of the intervertebral space. The portion of the posterior longitudinal ligament between the incisions, the annular ligament and the protruded intervertebral disc are excised, and the intervertebral space is thoroughly curetted. The dura and nerve roots are covered with a strip of cottonoid and retracted medially with a broad nerve root retractor, so as to protect them.

Depending on the depth to which one wishes to sink the drill hole, the longer or the shorter sleeve is chosen and inserted in a slightly oblique manner. The 1/2-inch drill is then placed in the sleeve and drilled between the vertebrae until it is stopped by the sleeve from further penetration. This prevents the drill from passing through the anterior surface of either vertebra. The drill and the sleeve are then withdrawn, and the loose cancellous bone is removed from the 1/2-inch hole between the distracted vertebrae. A 1/2-inch dowel is then pushed in firmly with a tampon and countersunk 1/4 inch.

In a similar manner the dura and nerve root on the opposite side are retracted medially, the sleeve is inserted in a slightly oblique position, the 1/2-inch drill is introduced into the sleeve and a hole is drilled between the vertebrae until the sleeve pre-

dans ces cas de procéder à la décompression du nerf.

La spondylosyndèse primaire est justifiée en présence d'une longue anamnèse de douleurs dorsales ou des jambes, avec confirmation radiologique ou opératoire d'instabilité. L'auteur pense que la spondylosyndèse intervertébrale est le procédé de choix. Dans un certain nombre de cas il a personnellement obtenu les meilleurs résultats par la méthode de double fixation des corps intervertébraux au moyen de "chevilles" osseuses. Grâce à ce procédé les soins post-opératoires, le séjour à l'hôpital et la période d'immobilisation ont pu être considérablement réduits. Les travailleurs de force ont pu reprendre leur travail six mois après l'opération; une employée de bureau a repris le travail au bout de trois mois.

La technique recommandée consiste en une greffe osseuse très précise, avec une évaluation exacte de l'os autogène. L'action favorable de la compression de contact sur l'ostéogénèse est utilisée dans ce type de spondylosyndèse. La perte de sang est réduite au minimum grâce à une incision limitée. Le saignement par les trous du forage osseux entre les vertèbres est minime, car il est jugulé dès la mise en place de la "cheville" osseuse. La mobilisation plus précoce est attribuée en partie à la section des filets sensibles dans le ligament longitudinal antérieur, au moment de l'excision du disque hernié.

SCHLUSSFOLGERUNGEN

Der Verfasser setzt sich für die völlige Entfernung einer verlagerten oder degenerierten Zwischenwirbelscheibe mittels umfangreicher Blosslegung zwischen den Laminae ein.

In manchen Fällen von ausgesprochener Erkrankung der Bandscheibe liegt auch eine Kompression des Nerven innerhalb

des Wirbelforamens vor, wodurch sich ein Beharren des Schmerzes nach Entfernung der Bandscheibe erklärt. In solchen Fällen sollte eine Dekompression des Nerven durch Entkappung des intervertebralen Kanals erfolgen.

Eine primäre Versteifungsoperation der Wirbelsäule wird in Fällen empfohlen, wo eine lange Anamnese von Schmerzen im Rücken oder in den Beinen besteht, und wo durch die Röntgenuntersuchung oder bei der Operation eine Unstabilität festgestellt wird, die einen solchen Eingriff rechtfertigt. Der Verfasser hält die Fusion der Wirbelkörper für das Verfahren der Wahl. In seiner Erfahrung an einer begrenzten Anzahl von Fällen hat sich die Wirbelkörperfusion mit angepassten doppelten Dübeln am besten bewährt und zu einer erheblichen Vereinfachung der postoperativen Behandlung und zu einer Verkürzung des Krankenhausaufenthaltes und der Dauer der Immobilisierung des Kranken geführt. Kranke, die schwerere körperliche Arbeiten ausführen, können innerhalb von sechs Monaten nach der Operation ihren Beruf wieder aufnehmen; eine Büroarbeiterin konnte schon nach drei Monaten zu ihrer Arbeitsstelle zurückkehren.

Die vom Verfasser empfohlene Technik besteht in präziser Knochentransplantation mit sorgfältiger Anpassung des autogenen Knochens, der natürlicherweise umso besser "einheilt," je sorgfältiger er angepasst ist. Diese Form der Fusion macht sich den wünschenswerten Effekt der Kontaktkompression auf die Knochenbildung zunutze.

Der Blutverlust ist äusserst gering, da nur ein kleiner Einschnitt an der Stelle der Knochentnahme ausgeführt wird, der sich leicht und schnell schliessen lässt. Die Blutung von den Bohrlöchern zwischen den Wirbeln ist ebenfalls sehr gering, und der Dübel verhindert, wenn er in das Loch eingeführt und in die richtige Lage fixiert

2. Dermoid cysts containing bone or teeth are present.

3. Some radiopaque material is introduced into the cyst after aspiration.

This article is concerned with the last-mentioned condition. After aspiration of the fluid from the cyst, ethiodol is injected into the cyst and roentgenograms are taken — anterior-posterior, lateral and oblique views. This is not recommended when pus has been aspirated. It is interesting to locate the cyst in relation to the bladder, so the bladder is filled with 20 per cent skiodan and the pelvic roentgenograms are taken again. Now the size and location of the cyst and its relation to the bladder may be known.

Robbins,² Marr and Portman³ and Snow⁴ have described the diagnosis of ovarian cysts by cystograms and bimanual palpation (abdominovaginal).

REPORT OF CASE

Mrs. H. W., a 47-year-old white woman, had been married twenty-eight years. She had had 4 pregnancies, resulting in 4 living children. Catamenia began when the patient was 12 years old and was regular until a hysterectomy was performed. Her past illnesses consisted of the usual childhood diseases, pneumonia in childhood, disease of the gallbladder fifteen years prior to this examination and a duodenal ulcer from 1938 to 1943 and in 1945. Recently she had suffered indigestion with gallbladder and colon disease.

The surgical history included an appendectomy in 1945 and a hemorrhoidectomy in 1953. A complete hysterectomy and right oophorectomy were performed on Aug. 4, 1955. The diagnosis was chronic cervicitis with squamous metaplasia, late secretory endometrium and corpus luteum cyst of the right ovary.

The present illness began about the first of April, 1956, with pain in the pelvis, a feeling of fullness, shooting pains down the legs, dizziness and nausea. The patient was first examined on April 2. A cystic mass approximately 10 by 12 cm. was palpated through the vagina, posterior and to the left. On April 20 the mass and previous symptoms were present. The former was easily palpated.



Fig. 1.—A, roentgenogram of ovarian cyst with ethiodol used as contrast medium. B, anteroposterior roentgenogram of ovarian cyst injected with ethiodol and bladder partly filled with 20 per cent skiodan solution. C, lateral view of B, showing relation of bladder to ovarian cyst.

There was no fever and very little tenderness. Fifty cc. of dark bloody material, as observed in endometrial ovarian cysts, was aspirated by

PLATE XII

FIG 7 —High power view showing all stages in the formation of the physaliphorous cells, from the earlier foamy appearance up to complete vacuolation. Hæmatoxylin and eosin $\times 970$

FIG 8 —High power view showing the formation of the larger vacuoles in the cytoplasm, the periphery of the cell body being still sharply outlined in the three larger cells, whilst in the others various stages of degeneration of the cytoplasm and its merging into the surrounding matrix are shown. Hæmatoxylin and eosin $\times 970$

FIG 9 —High power view showing, in addition to the changes already illustrated, a very well defined vacuole in the nucleus of the cell in the lower left corner. Hæmatoxylin and eosin $\times 970$

FIG 10 —High power view showing in many of the cells the formation of a single large vacuole in the cytoplasm. Displacement of nucleus and cytoplasm is shown in the cell in the bottom right corner, but in most the nuclei, if surviving, do not lie in the plane of the section. Early stages of nuclear vacuolation can be seen in a number of cells, the cytoplasm of which is becoming merged with the matrix. The latter shows in some parts a foamy character, whilst in others it gives a darker patchy staining, which with mucicarmine is pinkish red in colour. Hæmatoxylin and eosin $\times 970$

compara con la masa tumoral inflamatoria, se extirpa y se envía al patólogo.

REFERENCES

1. Steadman, H. E.: Supravaginal Pseudomucinous Cystadenoma; Case Report; X-Ray Diagnosis, *Obst. & Gynec.* 4:204, 1954.
2. Robbins, S. A.: Cystography as an Aid to Diagnosis of Pelvic Lesions in the Female, *Am. J. Roentgenol.* 18:546, 1929.
3. Marr, J. T., and Portman, U. V.: Incidental Findings in Urograms Concerning the Uterus, *Am. J. Roentgenol.* 51:426, 1944.
4. Snow, W.: Roentgenology in Obstetrics and Gynecology. Springfield, Ill.: Charles C Thomas, Publisher, 1952. 2d ed.

No one would wish to return to the brief and hard life, the smells and squalor, of a medieval city; but the fact remains that the men of those times were able to take pride in producing, by their own skill, works of the highest quality and beauty . . . Which all boils down to saying that they had certain incentives which are lacking today. Or, if you prefer alternative definitions, they had motives, provocations, or spurs, that roused them to live their short lives fully. What were these motives? Firstly, as already noted, life was brief and uncertain, death came readily to the young as well as to the old, and "men feared death as children fear the dark." Secondly, work was a natural thing. As Francis Bacon said, in his *Advancement of Learning*, "But men must know, that in this theatre of men's life it is reserved only for God and angels to be lookers on." Thirdly, skill was an essential, and "He that hath not the craft let him shut up the shop" to quote an ancient proverb. Most important, the standard of workmanship was judged by fellow-craftsmen, for "a workman is known by his work." Finally, the numbers of people were relatively small, and life was lived in common, whether in town or village.

It will be noted that I have omitted the greatest incentive of all, the spiritual; not because I do not believe in it, but because no amount of academic discussion will replace it if it has been lost.

—Banks

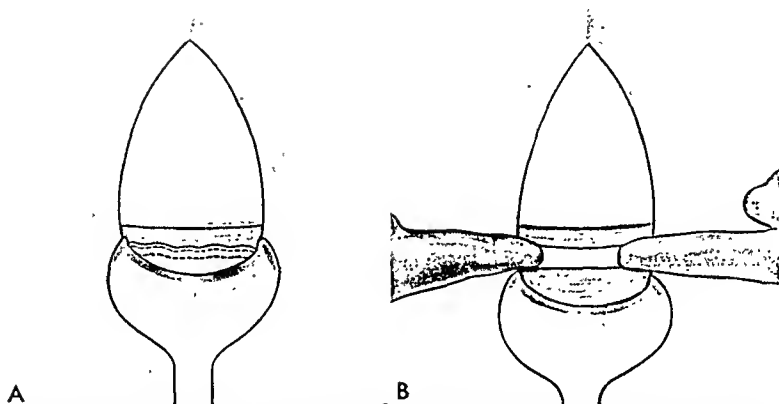


Fig. 2.—*A*, the entire posterior surface of the bladder is freed. The anterior lower uterine segment is adequately exposed below the readily visible peritoneal reflexion. *B*, entire bladder held caudad beneath the bladder retractor. The exposed lower uterine segment is opened transversely below the peritoneal reflexion.

every case there was, in my opinion, a clear-cut indication for cesarean section.

In only 1 case was frank infection present. Spinal anesthesia was used in every case. The peritoneum was accidentally opened in 4 cases—the first, second, fourth and eighth in the series. There were no immediate or delayed complications referable to the urinary tract. The first 15 patients were given prophylactic antibiotics; the last 16 were not. All but 1 had a technically afebrile postpartum course. In the first 2 cases a retention catheter was used electively for forty-eight hours after delivery. In 4 other cases single catheterization was necessary once only. In the remaining 25, postoperative voiding was spontaneous and adequate.

Before I used preliminary traction sutures at the lateral angles of the uterine

incision, lateral extension occurred in 1 case, with profuse bleeding that was difficult to control. This patient, afebrile preoperatively, had been given a blood transfusion before leaving the operating room. Her case is the only one in which there was a technically febrile puerperium. The temperature was elevated on the second, third and fourth postoperative days. There were no local complications, and the patient was discharged on the seventh postoperative day. A total operating time of seventy-nine minutes was required. If this case is eliminated, the average operating time was fifty minutes, the shortest time being thirty-five minutes and the longest (the first case in the series) sixty-five minutes.

Most of these 31 patients were ambulatory within thirty-six hours or less. The



Carcinoma of the Splenic Flexure Complicated by Pregnancy

I. HENRY EINSEL, M.D., F.I.C.S.

AND

RUDOLF COOKS, M.D.

CLEVELAND, OHIO

THE serious problem of carcinoma is still unsolved. Each year more facts are brought together, and it is reasonable to hope that the real solution of the problem is near—at least in the foreseeable future.

Malignant tumors in children and in pregnant women should be studied and recorded carefully. Carcinoma of the colon in pregnancy is a rare condition, and every case should be reported. The most common colonic location in pregnancy is the rectum and sigmoid. Only 1 case could be found in the literature in which the tumor was located above this region. This was reported by Waters and Fenimore, under the title "Perforated Carcinoma of the Cecum in Pregnancy."¹ The patient's age was 37.

A case was reported by Finn and Lord² in which a tertipara aged 31 had complete obstruction. At operation an annular carcinoma of the sigmoid portion of the colon was observed. After a decompression transverse colostomy the carcinoma was resected and an end-to-end anastomosis made. The patient survived three operations—colostomy, resection and closure of the colostomy.

DerBrucke³ of Brooklyn, in an article "Intestinal Obstruction Due to Malignancy Complicating Pregnancy," reported 2 cases. In the first a primipara aged 23

complained of severe constipation. She was seven and one-half months pregnant. Roentgen study revealed pronounced distention of intestinal loops, mostly of the small bowel. The large intestine was filled with gas to the sigmoid portion of the colon and terminated at this point. Labor was induced, and a live boy weighing 2,100 Gm. was delivered. Subsequently a Mikulicz procedure was done, and the patient died eight hours later. Autopsy and specimen confirmed the presence of *adenocarcinoma of the sigmoid portion of the colon*.

In DerBrucke's second case a tertipara aged 36 was six months pregnant. Acute obstruction developed, and at operation a carcinoma was observed in the sigmoid flexure, with metastasis to the omentum. Biopsy of the omentum showed adenocarcinoma. After cecostomy the patient went downhill. She died two months later.

REPORT OF AN ADDITIONAL CASE

On Dec. 22, 1953, a primipara aged 24, at the full term of pregnancy, was admitted to Woman's Hospital for delivery. The patient's mother stated that during the last six weeks of pregnancy the patient's constipation had increased noticeably. She was first given petrolagar and liquid petrolatum, followed by milk of magnesia and finally by epsom salts and castor oil. She had finally resorted to the use of enemas. After her admission to the hospital the labor pains disappeared, but the abdomen was distended with gas. Three days later she was discharged. She was readmitted on December 26, in genuine labor. Spinal anesthesia was induced, and a living boy weigh-

From the Surgical Service of Woman's Hospital, Cleveland, Ohio.
Submitted for publication Nov. 2, 1956.

the commonly described and most characteristic feature of these tumours, but the well marked vacuolation of the nuclei in the present case is a phenomenon less frequently found, though its occurrence was noted by Stewart in his first case (1922) In the present instance the appearances suggest that the nuclear vacuolation is usually a later development than the cytoplasmic, being seen particularly in cells in which cytoplasmic vacuolation is already far advanced, often with peripheral displacement of the nucleus In some of the more slow-growing and less cellular portions of the tumour, where the physaliphorous process is well established, there is a superficial resemblance to the appearances seen in "gelatinous degeneration" of bone-marrow

This tumour was typical in that it exhibited a locally destructive action upon neighbouring bony structures, notably, the posterior clinoid processes Only certain limited areas of the tumour were in any degree vascular, but into and from these more vascular portions must have occurred the series of hæmorrhages (the first probably at the time of the bicycle accident) which ultimately led to the death of the patient

REFERENCES

- | | |
|---------------------|---|
| BURROW, J LE F, AND | "Malignant spheno occipital chordoma," <i>J</i> |
| STEWART, M J | <i>Neurol and Psychopath</i> , 1923 24, iv 205 |
| MABREY, R E | "Chordoma a study of 150 cases" <i>Amer J</i> |
| | <i>Cancer</i> , 1935, xxv 501 |
| STEWART, M J | "Malignant sacrococcygeal chordoma" <i>this</i> |
| | <i>Journal</i> , 1922, xxv 40 |

SUMMARY

Statistical study shows that the location of cancer of the colon is the same whether the patient is pregnant or not pregnant.

A careful history of the changing bowel habits in pregnancy will help in making an earlier tentative diagnosis and a final confirmed diagnosis of carcinoma of the colon, so that early definitive treatment may be instituted.

The authors report the second proved case in which carcinoma of the colon was observed above the sigmoid colon and the first in which it occurred in the splenic flexure. The patient is the second youngest pregnant woman whose case appears in the literature with the diagnosis of anaplastic adenocarcinoma of the colon above the rectum.

RIASSUNTO

Studi statistici hanno dimostrato che la localizzazione del cancro del colon è la stessa, indipendentemente dallo stato di gravidanza o meno della paziente. Una attenta inchiesta sulle modificazioni della funzione intestinale in corso di gravidanza potrà aiutare nel tentativo di fare una diagnosi precoce, in modo di poter più precocemente istituire una terapia appropriata.

Gli autori descrivono il secondo caso documentato in cui si osservò un carcinoma del colon localizzato al di sopra del sigma e il primo della flessura splenica. Tale paziente è la seconda per età giovanile fra le gravide il cui caso è descritto nella letteratura come affetta da adenocarcinoma del colon al di sopra del retto.

RESUMÉ

Les statistiques montrent que la localisation du cancer du colon est la même

chez les femmes enceintes ou non. Une anamnèse précise des modifications des réactions intestinales durant la grossesse permet une tentative de diagnostic plus précoce du carcinoma du colon qui, s'il est confirmé, fera bénéficier les malades d'un traitement radical également précoce.

Les auteurs rapportent le second cas avéré de carcinome du colon situé au-dessus du sigmoïde, et le premier cas dans lequel il fut observé dans l'angle splénique. Il s'agit de la deuxième femme gravide la plus jeune mentionnée dans la littérature avec le diagnostic d'adénocarcinome anaplastique du colon, au-dessus du rectum.

ZUSAMMENFASSUNG

Statistische Untersuchungen ergeben keinerlei Unterschiede hinsichtlich des Dickdarmkrebses, ob es sich um schwangere oder nichtschwangere Patientinnen handelt.

Eine sorgfältige Beobachtung der Stuhlgewohnheiten während der Schwangerschaft verhilft zu einem frühzeitigen Verdacht und früherer Erkennung und Bestätigung und folglich auch zu rascherer Einleitung energischer Behandlung eines Dickdarmkarzinoms.

Die Patientin, über die hier berichtet wird, stellt den zweiten nachgewiesenen Fall eines Dickdarmkrebses oberhalb des Sigmoideums und den ersten in der Flexura lienalis beobachteten dar. Sie ist die zweitjüngste schwangere Frau in der Literatur, bei der die Diagnose eines anaplastischen Adenokarzinoms des Dickdarms oberhalb des Rektums gestellt wurde.

SUMARIO

Estudo estatístico mostra que a localização do cancer do colo é a mesma quer se trate de paciente grávida ou não. Uma cuidadosa historia das modificações inte-

cellophane as a dialysing membrane against a broth medium might throw some light on the reason why the staphylococcus, unlike all the other toxigenic bacteria in ordinary laboratory use, should require the presence of agar in order to produce toxins of reasonable potency. Moreover the use of agar renders the process of harvesting the toxin wasteful and laborious. The observations to be described here deal with the investigation of this point and the application of the knowledge gained to the preparation of staphylococcus toxin and toxoid*.

Part I The production of toxin in a broth diffusate

METHODS

Strain of staphylococcus and its maintenance

The strain used, "Wood 46," has produced satisfactory amounts of hæmolyisin over a considerable period of time in many laboratories, it does not produce significant amounts of the β lysin described by Glenn and Stevens (1935) and no observations on the production of this lysin have been made during the course of these experiments. The strain was maintained at room temperature in the medium described by Worth (1919). This is an infusion broth prepared with beef to which 10 per cent gelatin is added. The staphylococcus survives in this medium at room temperature for many months with its toxigenic capacity unimpaired. Eighteen hour subcultures on ordinary nutrient agar served as inoculum for toxin production.

Method of cultivation in a broth diffusate medium

The specially arranged dialysing apparatus in which the staphylococcus was cultivated is shown in the accompanying diagram. A measured quantity of broth was placed in a glass bottle with a wide neck. The volume of broth used in the early experiments was 500 c.c., but in view of observations which will be described, this volume was later reduced to 100 c.c. A cellophane bag was tied tightly with string to a flanged glass tube and introduced into the broth, the length of the tube was adjusted to project through the neck of the bottle, which was plugged with cotton wool. The open end of the glass tube was similarly plugged. This apparatus, with the broth in the bottle, was sterilised in the autoclave and, after cooling, 50 c.c. of sterile saline were introduced into the bag through the glass tube. Dialysis was allowed to proceed overnight at room temperature with the result that various constituents of the broth passed through the membrane into the saline contained in the cellophane bag. The fluid in the bag, which constituted the medium in which the culture was grown, is referred to throughout this paper as the "broth diffusate" or the "diffusate medium" or shortly the "diffusate"†. Its reaction should be pH 6.872. The diffusate

* The experimental results dealt with in part I of this paper were communicated to the Section of Pathology of the Royal Society of Medicine on 6th November 1934. Owing to the unexpected interpretation of these results which was provided by the work described in part II, publication of the earlier experiments was delayed until the work was completed.

† In several recent papers the word "dialysate" is used to mean which passes through a dialysing membrane. On the other hand the Oxford Dictionary and Webster's International Dictionary define as the portion of the original material which remains after dialysis. The portion which passes through the membrane is termed the "dialysate" as so defined that this term is used in the present paper.

the past, the school of "let them rough it out" has had in its favor the obvious fact that many such castrated patients may have few symptoms of steroid withdrawal. It is also true that if there is an immediate postoperative storm due to the withdrawal of steroids, it may be of short duration. The basic mistake of the proponents of this starvation approach is that they are obviously concerned only with controlling menopausal symptoms. They make no attempt to treat the physiologic body economy or to protect the patient after the operation, against the statistically established⁷ rapid onset of multiple degenerative disease processes.

Presuming that the vital concerns of adequately maintained steroid economy are accepted by the medical profession, surgery is still on the horns of a dilemma. Should all possible effort be made to preserve apparently normal ovarian tissue, even in a patient 60 years old, at the time some other indicated operation is performed? This is really an unsolved problem. The question highlights two opposite schools of thought as to elective oophorectomy after the essential decline of gonadal reproductive function.

In the past the rationale of elective oophorectomy was the well established fact that roughly 1 out of every 100 women past the age of 40 will die of ovarian cancer. In an attempt to combat this threat, elective oophorectomy was recommended whenever surgical opportunity arose.

At the meeting of the American College of Obstetricians and Gynecologists in December 1955, Griffith⁸ presented the arguments for retaining ovarian tissue whenever surgically conceivable. He pointed out effectively the postmenopausal role of ovarian tissue in protein and carbohydrate metabolism and the obvious sex steroid protection against senile diabetes and atherosclerosis. In women who had undergone bilateral oophorectomy it was noted

by Wuest, Dry and Edwards⁹ that by the age of 50 a degree of coronary atherosclerosis had developed that was not reached by a control age group until after the seventieth year. These authors, describing ten-year groups, observed an incidence of severe coronary atherosclerosis from 10 to 45 per cent higher in oophorectomized women than in controls. The aforementioned interrelation of the ovaries with other members of the endocrine chain was also emphasized by these writers to strengthen further the argument for retention of apparently normal ovarian tissue, regardless of the age of the operative patient.

Although there is no question of the vital role played by the sex steroids in the aging person's basic physiologic condition, there is much room for argument as to the efficacy of elective oophorectomy. In brief, evidence now suggests that it is perfectly possible to maintain adequate physiologic body economy after a routine elective oophorectomy by means of modern steroid replacement technics. Since the weapons to combat the unfortunate results of sex steroid starvation are now available, there should be no hesitation to perform elective resection of ovarian tissue that has lost its reproductive significance. Thus, protection against carcinoma of the ovary is available without prejudice to body economy.

The rationale of the theory in favor of "puberty-to-grave" sex steroid support is the complete conviction that steroid support is of vital concern throughout the aging span of human existence. The combination technics recently described,¹⁰ employing an androgen-over-estrogen ratio of 20:1; have successfully answered the steroid replacement demand. This type of replacement therapy can certainly be instituted after elective oophorectomy, even at the age of 40, as well as after a physiologic menopause at the age of 50. Economically these technics have come within the

cellophane as a dialysing membrane against a broth medium might throw some light on the reason why the staphylococcus, unlike all the other toxigenic bacteria in ordinary laboratory use, should require the presence of agar in order to produce toxins of reasonable potency. Moreover the use of agar renders the process of harvesting the toxin wasteful and laborious. The observations to be described here deal with the investigation of this point and the application of the knowledge gained to the preparation of staphylococcus toxin and toxoid*.

Part I The production of toxin in a broth diffusate

METHODS

Strain of staphylococcus and its maintenance

The strain used, "Wood 46," has produced satisfactory amounts of hæmolsin over a considerable period of time in many laboratories, it does not produce significant amounts of the β lysin described by Glenn and Stevens (1935) and no observations on the production of this lysin have been made during the course of these experiments. The strain was maintained at room temperature in the medium described by Worth (1919). This is an infusion broth prepared with beef to which 10 per cent gelatin is added. The staphylococcus survives in this medium at room temperature for many months with its toxigenic capacity unimpaired. Eighteen hour subcultures on ordinary nutrient agar served as inoculum for toxin production.

Method of cultivation in a broth diffusate medium

The specially arranged dialysing apparatus in which the staphylococcus was cultivated is shown in the accompanying diagram. A measured quantity of broth was placed in a glass bottle with a wide neck. The volume of broth used in the early experiments was 500 c.c., but in view of observations which will be described, this volume was later reduced to 100 c.c. A cellophane bag was tied tightly with string to a flanged glass tube and introduced into the broth, the length of the tube was adjusted to project through the neck of the bottle, which was plugged with cotton wool. The open end of the glass tube was similarly plugged. This apparatus, with the broth in the bottle, was sterilised in the autoclave and, after cooling, 50 c.c. of sterile saline were introduced into the bag through the glass tube. Dialysis was allowed to proceed overnight at room temperature with the result that various constituents of the broth passed through the membrane into the saline contained in the cellophane bag. The fluid in the bag, which constituted the medium in which the culture was grown, is referred to throughout this paper as the "broth diffusate" or the "diffusate medium" or shortly the "diffusate"†. Its reaction should be pH 6.872. The diffusate

* The experimental results dealt with in part I of this paper were communicated to the Section of Pathology of the Royal Society of Medicine on 6th November 1934. Owing to the unexpected interpretation of these results which was provided by the work described in part II, publication of the earlier experiments was delayed until the work was completed.

† In several recent papers the word "dialysate" is used to mean the material which passes through a dialysing membrane. On the other hand, the Shorter Oxford Dictionary and Webster's International Dictionary define "dialysate" as the portion of the original material which remains after dialysis. The crystalloid portion which passes through the membrane is termed the "diffusate". It is as so defined that this term is used in the present paper.

arteries. By careful dissection it was removed almost *in toto*, only an extremely small portion remaining over the left iliac artery. All raw surfaces were peritonized, and the abdomen was closed in layers.

The attending pediatrician expressed the opinion that the development and condition of the babies were so good that no incubation or special attention was needed. The weight of the intrauterine baby was 4 pounds and 6 ounces (1,984 Gm.) and that of the intra-abdominal was 4 pounds and 15 ounces (2,693 Gm.). Both were girls.

The mother's postoperative course was smooth, with no elevation of temperature beyond 100 degrees. Both mother and infants were discharged from the hospital on the eighth day and have progressed normally since.

SUMMARY

A case is reported in which simultaneous abdominal and intrauterine pregnancies existed in a 23-year-old primipara. The patient was delivered by cesarean section, and the intrauterine fetus proved normal and healthy. Since there was no other fetus within the organ, the incision was enlarged, revealing a membranous sac resembling a second uterus. This was recognized as primarily an abdominal pregnancy. The sac was opened and a second normal child delivered, crying spontaneously. Both infants were girls. No incubation was required for either, and the mother also did well. All three were discharged from the hospital in good condition on the eighth day after the birth.

ZUSAMMENFASSUNG

Es wird über einen Fall von gleichzeitig bestehender uteriner und Bauchschwangerschaft bei einer 23jährigen Erstgebärenden berichtet. Die Entbindung erfolgte durch Kaiserschnitt, und es fand sich in der Gebärmutter ein normaler und gesunder Fötus. Da kein zweiter Fötus

im Uterus war, wurde der Einschnitt verlängert, und es zeigte sich ein membranartiger Sack, der einer zweiten Gebärmutter ähnelte. Es stellte sich heraus, dass es sich um eine primäre Bauchschwangerschaft handelte. Der Sack wurde eröffnet, und ein zweites normales Kind, das spontan zu schreien begann, wurde entbunden. Keines der Kinder erforderte Unterbringung im Brutofen, und das Befinden der Mutter war gut. Die Entlassung der Mutter und beider Kinder erfolgte in gutem Gesundheitszustand am achten Tage nach der Entbindung.

RÉSUMÉ

L'auteur rapporte un cas de grossesse à la fois abdominale et intra-utérine chez une primipare de 23 ans. La césarienne a montré un fœtus intra-utérin normal. L'incision fut élargie et fit apparaître un sac membraneux contenant un second fœtus normal, criant spontanément. La mère et les deux nouveaux-nés ont pu quitter l'hôpital en bonne santé huit jours après la naissance.

RIASSUNTO

Viene riferito un caso di gravidanza addominale e intrauterina simultanea in una donna primipara di 23 anni. La paziente fu sottoposta a taglio cesareo: il feto intrauterino era vivo e normale, ma poiché non vi era alcun altro feto nell'utero la incisione fu allargata rivelando un sacco membranoso simile ad un altro utero. Si trattava di un'altra gravidanza, ma in sede addominale. Anche questo sacco venne aperto e conteneva un feto vivo, che si mise subito a piangere. Non fu necessaria la incubatrice, e anche la madre stava bene, cosicché furono dimessi tutti tre dall'ospedale dopo 8 giorni.

value rather than the minimum hæmolytic dose of the filtrate was taken as the criterion of potency because the former provides a measure of the combining power of the filtrate for antitoxin and hence a means of comparing the potency of different samples with reference to an accepted antitoxin standard. In the tables which follow, the *Lh* value of the toxin is the smallest volume of the toxin which, after mixture with 1 unit of antitoxin, will produce partial hæmolysis of 1 c c of a 3 per cent suspension of rabbit red blood cells.

In addition, many samples were titrated by using the intracutaneous route in the guinea pig and the intravenous route in the mouse. When these methods were employed the doses of toxin were also previously mixed with a standard amount of antitoxin. The minimum hæmolytic dose, the *mrd* and the lethal dose of a toxin may increase rapidly during storage while the *Lh*, *Lr*, and *L+* doses remain remarkably constant.

Many samples of the toxins and of the toxoids obtained from them were titrated by flocculation tests with a standard antiserum. These tests were set up in the manner usually employed for the titration of other toxins and the resulting flocculation was definite and reasonably rapid. The toxoids were also tested for their combining power with antitoxin by the displacement of free toxin and the titration of the resulting hæmolysis of rabbit cells. These tests were made in order to correlate the results of *in vivo* and *in vitro* determinations of the antigenicity of different samples of toxoid.

EXPERIMENTAL RESULTS

Cultivation of the staphylococcus in the cellophane bag

In the first experiments 50 c c of saline in the cellophane bag were dialysed against 500 c c of broth for 18 hours. The diffusate was then inoculated *in situ* and the whole apparatus incubated for 48 hours at 37° C. The results are summarised in table I.

It will be seen that the yield of hæmolysin from the diffusate compares favourably with that obtained by the agar plate method, the yield from individual bags, however, shows considerable variation. The broth outside the bag contained no detectable hæmolysin, when the external broth was accidentally contaminated or deliberately inoculated with a staphylococcal suspension the yield of toxin in this medium was either negligible or very weak, rarely having an *Lh* value of less than 0.75 c c.

The influence of adding phosphate solution to the cellophane bag

In the method described above, the volume of fluid in the bag after dialysis was reduced from 50 c c to about 38 c c. Experiment showed that if the saline were replaced by a 20 per cent phosphate solution at pH 7.0 the volume of the diffusate could be stabilised at about 45 c c. Since the broth already contained 2 per cent phosphate the final concentration of this salt on both sides of the membrane was 5 per cent. This amount of phosphate apparently did not influence the multiplication of the inoculated staphylococci,

The position of function of the hand is that of slight extension of the wrist, slight flexion of the fingers and adduction of the thumb.

D. Neurotrophic Changes: These often occur early, and one must be alert to recognize them and institute treatment immediately. These changes will be alluded to later.

Specific Injuries.—Generally speaking, most fractures of the phalanges and metacarpals are treated in outpatient dispensaries or in the course of office practice, with little regard to fundamental principles. Yet in the treatment of any fracture nothing compares with proper reduction and adequate, prolonged immobilization until union has been effected.

Mallet Finger: Injury to the distal phalanx is one of the most difficult to treat. The posterior articular facet is detached, or the extensor tendon has been ruptured, giving rise to the so-called dropped finger, which in women constitutes a major deformity. Treatment ranges from conservative handling to radical surgical intervention.

Conservative measures consist in the application of any external appliance that will maintain the distal joint in hyperextension. The surgical treatment consists in open reduction with suturing or the use of intramedullary fine wires.⁵ Lately a unique procedure has been proposed by Hillman,⁶ in which hyperextension of the distal joint is maintained by means of silk sutures placed in mattress fashion through the pulp and the finger nail, then drawn out and sutured to the soft tissues on the dorsums of the fingers just distal to the proximal interphalangeal joint.

There appear to be many objectionable features in all of these methods of treatment. Splints and external appliances are often clumsy and may lead to soft tissue necrosis. The use of intramedullary pins is also fraught with danger, and it has

been my experience that when they are used the range of motion in the distal joint is never regained. For the past five years I have made use of an external splint and have been gratified with the end results. A short Lewin⁷ splint is used, and drill holes are placed on both medial and lateral edges. The splint is then heat-sterilized, and, prior to its application, heavy silk sutures are placed on the medial and lateral side of the finger through all the soft tissue layers between the distal and the proximal interphalangeal joint. After this the splint is well padded and placed upon the digit. The digital joint having been placed in hyperextension, sutures are threaded through the prepared holes and tied, then wound about the splint. The splint is then further reinforced with ordinary adhesive "moleskin." It remains in place for six weeks.

This procedure obviates the necessity of changing the splint at intervals and also prevents the patient from removing the splint.

Fracture of the Middle Phalanx: The treatment of this fracture depends on the site of insertion of the tendon of the flexor digitorum sublimis. Fracture proximal to the insertion of this muscle causes a dorsal bowing deformity and can be reduced and maintained by means of straight splint. Fracture distal to the insertion of this muscle produces the opposite deformity, anterior bowing. Reduction is simple and is done by maintaining the middle joint in approximately 45 degrees of flexion. A simple method of accomplishing this is to use a dorsal molded plaster splint that encases the hand to permit freedom of the wrist. I have never found it necessary to use skeletal traction or intramedullary fixation in the treatment of this fracture.

Fracture of the Proximal Phalanx: Fracture of this phalanx causes a V-shaped deformity, as a result of action of the inter-

Cultures were now set up in which the amount of broth outside was varied while the volume of saline introduced into the bags was kept constant. In one experiment 50 c.c. of broth were dialysed against 250 c.c. of saline. Table III shows the results obtained in four different sets of cultures under these varying conditions.

TABLE III

Influence of varying the relative volume of saline inside the bag to broth outside

Batch.	Saline/broth ratio				
	50/500 c.c.	50/200 c.c.	50/125 c.c.	50/50 c.c.	250/50 c.c.
18	0.2	0.125	0.125	0.05	< 1.0
19	0.075	0.1	0.1	0.15	
	0.1	0.15	0.15	0.075	
20	0.15	0.3	0.2	0.15	
23		0.3	0.3		
	0.5	0.2			
	0.3	0.3	0.4	0.3	

The figures show the Lh dose in c.c. of each sample of toxin.

Decrease in the volume of the broth did not adversely influence the yield of hæmolysin except in one experiment in which the volume of saline was actually greater than that of the broth. In the preparation of all subsequent batches of toxin the volume ratio of 100 c.c. of broth outside to 50 c.c. of saline inside the bag was adopted.

Cultivation of the staphylococcus in the broth diffusate after separation from the broth

It was of some interest to determine whether the staphylococcus would produce a satisfactory yield of hæmolysin if, after the usual period of dialysis, the contents of the bags were transferred to separate Erlenmeyer flasks, which were inoculated and incubated in the usual way. If this method should yield satisfactory results it would simplify the method of toxin production. Table IV shows the results in a considerable number of separate cultures.

Alteration of the broth/saline ratio did not influence the yield of hæmolysin from cultures in the diffusate which had been separated from the broth any more than it did from cultures *in situ*. With this method of culture also the proportions adopted were 50 c.c. of saline and 100 c.c. of broth. In some of these cultures the contents of the various flasks were pooled before titration but, as will be seen in table IV, many separate titrations of individual flasks were made. It is apparent that in the majority of the cultures the yield of hæmolysin was much reduced when the diffusate was removed from the bags before inoculation, but that

usually is no displacement of the fragments. In the occasional fracture of the proximal third with pronounced displacement, difficulty may be encountered in reduction.

Reduction and immobilization of this fracture may be either conservative or radical. Conservative treatment consists in immobilization of the wrist in 30 degrees of extension and slight radial deviation. This immobilization is obtained by using a snug plaster cast¹² extending from below the elbow to the middle third of the hand and including the thumb up to the distal joint, the thumb being placed in slight abduction and volar flexion. Radical therapy consists in exposure of the fracture site and immobilization by metallic fixation.¹³ When the fracture occurs through the proximal third and there is difficulty in maintaining position, it is suggested that the proximal fragment be surgically removed and that this be followed by immobilization for at least six weeks.

The conservative treatment of fracture through the middle third requires a long period of immobilization, during which the patient can carry on active motion of the fingers and the distal joint of the thumb. It is often necessary to change the cast during this period. Immobilization should not be dispensed with until union can be proved by roentgen studies. It has been my practice to maintain immobilization for sixteen weeks before a check-up roentgen examination is done. Since 1954, 10 fractures of the middle third have been selected for surgical intervention. The fracture was exposed over the dorsum of the wrist and inspected, then fixed by means of a lag screw.¹³ I have encountered a good deal of difficulty in the fixation of a majority of such fractures. Theoretically the procedure seems simple; practically, however, difficulty has been encountered in handling the proximal fragment. On two occasions, when the lag screw was in-

serted, comminution of the proximal fragment occurred. In 3 cases there was pronounced absorption about the lag screw with cyst formation, leading to early non-union. In 3 of the remaining 5 cases absorption at the fracture line occurred, with shifting of the navicular bone; this caused prominence of the screw and required its removal. In the 2 remaining cases union occurred when the treatment was supplemented by plaster cast fixation. This method, though apparently attractive (in that one depends upon internal fixation without external immobilization), is difficult and fraught with danger; it requires most careful technic and after-care. It is hoped, however, with continued treatment and investigation of this fracture, that an improvement in the end results may be obtained by internal fixation with or without external immobilization. At present, however, it would appear that the best results are still obtained by immobilization prolonged until union occurs. This long period of disability and the economic loss related thereto may seem a high price to pay even for a good result.

Complications and Sequelae.—*Compression of the Median Nerve:* Compression of the median nerve in the carpal canal can occur as result of injury to the wrist. This compression causes numbness, tingling and painful burning of the fingers over the area supplied by this nerve. In some instances this is followed by weakness, sensory loss and atrophy of the thenar eminence. Restriction of movement of the flexor group of tendons is often present. Compression can take place with or without fracture of the bones that make up the wrist joint; often it follows a single injury, or occurs in persons engaged in an occupation requiring a great deal of motion of the wrist.¹⁴ When it is the result of trauma, the treatment is surgical and consists in division of the transverse carpal ligament.

The addition of saline to the bags before and after heating in the autoclave

The procedure would be simplified and the risk of contamination reduced if the saline could be introduced into the cellophane bag before the whole apparatus was sterilised in the autoclave. A few preliminary experiments indicated that it was essential that dialysis should take place after the broth had cooled, but on further investigation this conclusion was not supported. Table V shows the results with batches of toxin in which parallel cultures were made (a) in cellophane bags which had been sterilised after the addition of saline and (b) in bags to which the saline was added after the broth had been sterilised and cooled to room temperature.

TABLE V
The influence of heat during dialysis

Batch	Saline added to bag before autoclaving	Saline added to bag after autoclaving and cooling
41	0 15	0 15
42	0 2	
43	0 25	0 175
44	0 2	0 25
45	0 2	0 175
46	0 25	0 175
51	0 15	0 3
52	0 175	0 175
54	0 1	0 1

Figures denote *Lh* in c c of each sample of toxin

In several batches the toxins obtained from the bags which were filled before sterilisation were slightly weaker than those in which the saline was added after cooling, but when the results are taken together it is doubtful whether this difference is significant.

Composition of the diffusate medium

It was obvious from the appearance of the diffusate that a considerable amount of material in the whole broth did not pass through the cellophane into the bags and yet the fluid in these bags provided an adequate medium for toxin production by the staphylococcus. It was of interest to compare the total weight of dry solids in the whole broth and in the diffusate both before and after multiplication of the organism. The total nitrogen content of the diffusate was estimated and compared with that of several other bacteriological media.

Table VI shows the distribution of the total solids, the total nitrogen and the amino-nitrogen in the diffusate and in the broth.

blocking agents, physical therapy is instituted (application of heat, together with gradual increase in active motion). Clinical recovery occurs long before reossification of the bones has taken place, so that one must not base the time of recovery upon the changes that occur in the roentgenograms. There is no short cut in treatment, and treatment requires the combined efforts of the surgeon, the patient, the physical therapist and often the occupational therapist.

CONCLUSIONS

A plea for conservatism in the treatment of injuries to the small bones and attendant structures is made. Although fractures and injuries of long bones and other major structures may appear more spectacular and dramatic, injury to a small bone requires just as much care, combined with a complete understanding of anatomy and pathologic physiology. A plea is also made for a more conservative attitude as regards surgical intervention. Although internal fixation in the hands of the few has produced good results, only those with complete training in this field should attempt it.

The role of the articular disc as an important factor in wrist disability is emphasized, and a treatment for this type of derangement is advanced.

Complications and sequelae of injuries to the small bones and attendant structures require alertness and demand early and proper intensive treatment.

CONCLUSIONES

Se hace énfasis acerca de la tendencia conservadora en el tratamiento de traumatismos de pequeños huesos y estructuras dependientes. No obstante que los traumatismos y fracturas de los huesos largos y de otras estructuras mayores parecen

más espectaculares y dramáticas, los traumatismos a los pequeños huesos requieren el completo conocimiento de la anatomía y fisiología patológica. Se hace énfasis también sobre una decisión conservadora acerca de la intervención quirúrgica. No obstante que la fijación interna ha dado buenos resultados en manos de algunos, son procedimientos que solo deben emplearlo los que tengan un conocimiento completo al respecto. Se enfatiza el papel del disco articular como un factor importante en el desarrollo de incapacidad de la muñeca y un tratamiento para este tipo de desarreglo se menciona.

Las complicaciones y secuelas de los traumatismos a los pequeños huesos y estructuras dependientes requiere agudeza de criterio y exige un tratamiento intensivo apropiado y temprano.

CONCLUSOES

Estebelece uma tendencia conservadora no tratamento das lesões dos pequenos ossos e estruturas vizinhas. Apesar de aparentemente espetaculares e dramaticas as lesões dos ossos longos também os traumatismos dos pequenos ossos exigem o mesmo cuidado e conhecimento completo da anatomia e da fisio-patologia. A fixação intra medular que tem dado bom resultados a poucos cirurgiões so deve ser utilizada por quem dispõe de solidas bases do assunto. Salienta o papel do disco articular no desenvolvimento da estabilidade do punho, propondo um tipo de tratamento para sua patologia. As sequelas e complicações das lesões dos pequenos ossos e estruturas adjacentes demanda vigilância e requer tratamento precoce e intensivo.

SCHLUSSFOLGERUNGEN

Der Verfasser tritt für eine konservative Form der Behandlung von Verletzungen kleiner Knochen und der anliegenden Gebilde ein. Die Brüche und Verletzungen

the bag This change must have been produced by the bacterial metabolism occurring in the diffusate and suggests that, whereas the toxin is retained in the diffusate inside the bag, other metabolic products pass out into the broth The toxin which is finally harvested from the diffusate in the bag thus contains relatively less of the non-specific bacterial products than a toxin produced in the whole medium Whatever may be the explanation of these changes in distribution, it is obvious from the table that "diffusate" toxin contains considerably less total dry solids, total nitrogen and amino-nitrogen than a toxin prepared in the whole medium

It was of interest to compare the total nitrogen content of a "diffusate" toxin with that of toxins prepared in other media and with the nitrogen content of standard media used for the production of both staphylococcal and other toxins These figures, kindly supplied by Miss M Llewellyn Smith of the National Institute for Medical Research, Hampstead, are given below

Bigger's medium	3 88 mg N per c c
Toxin prepared in Bigger's medium	2 66 " "
" " " diffusate	1 70 " "
Parish Clark broth	4 11 " "
Toxins prepared in Parish Clark broth	3 37 3 99 " "
Pope Smith (1932) broth for diphtheria toxin production	5 98 " "
Diphtheria toxin made in this broth	5 39 " "
Hartley's broth	3 55 " "
Asheshov's (1932 33) papain broth	7 92 " "

It will be seen that the total nitrogen present in the "diffusate" toxin is considerably less than that in any of the other media or toxins examined

The antigenicity of toxoids derived from toxins produced in the diffusate medium

Table VII shows some comparative values obtained for toxins and their corresponding toxoids The "plate" toxins were produced from cultures in Petri dishes of Bigger's medium, the "diffusate" toxins from cultures in the cellophane bags in contact with the broth All the toxins were treated with 0.2 per cent formaldehyde at 37° C until detoxication was complete The tests for absence of toxicity used were (1) absence of local lesion or illness following the subcutaneous injection of 5 c.c. of undiluted toxoid in a guinea-pig of 300-400 g, (2) absence of lesions following the intracutaneous injection of 0.2 c.c. of undiluted toxoid into a guinea-pig, (3) absence of hæmolysis by a 1:5 dilution of toxoid in an equal volume of red-cell suspension, (4) the intravenous injection into 2 rabbits of 2.5 c.c. of toxoid per kg body weight The animals must survive this injection for at least three days

Chronic Nonspecific Inflammation.—Chronic nonspecific inflammation of the mouth, pharynx and larynx is common and may be due to a number of factors. Mouth breathing, hot spicy foods, alcohol, dry or dusty air or infection of the nose and sinuses may contribute to this condition. Subjective complaints may be absent; when present, they may include dryness and burning of the mouth and throat, post-nasal discharge, hoarseness and cough. The objective signs of chronic inflammation are hyperemia, edema and thickening of the mucosa. Hyperemia is most common. The color of the mouth and pharynx varies so much that it is difficult to decide what is normal and when disease is present. Proetz² encountered great disagreement among different observers as to what constitutes a "red throat." The normal appearance of the vocal cords is more constant; in the mirror they normally appear as flat white bands. Hyperemia, thickening and edema are more obvious. Chronic inflammation of the palate, pharynx and larynx is commonly present in persons who have smoked for years, even though no other cause is evident. The symptoms and signs do not seem serious enough to insist on or to compel the patient to stop smoking; one does not often have the opportunity, therefore, to determine whether this causes improvement in the appearance of the throat. An opportunity occurs at times when the patient has stopped smoking for some other reason, and in such instances a decrease in the signs of chronic inflammation is noted.

Those conducting histopathologic studies have recently noted that chronic inflammation of the respiratory epithelium is more common in smokers than in non-smokers. Ryan, McDonald and Devine³ examined sections of 52 larynxes removed at autopsy. They were from male cadavers, 40 to 60 years old at the time of death, with no known laryngeal disease. In the

smokers there was greater thickness of the surface epithelium, due partly to excessive keratinization but mainly to hyperplasia. There was also greater round cell infiltration, edema and squamous metaplasia in the smokers than in the non-smokers. Auerbach and his co-workers⁴ made similar studies on the mucosa of the tracheobronchial tree in 41 persons. They encountered basal cell hyperplasia much more commonly in smokers than in non-smokers. Stratification and squamous metaplasia were also slightly more common in smokers.

Considered together, the laboratory and animal studies on tobacco smoke, the subjective and objective symptoms observed in smokers and the recent histopathologic studies, there would seem to be convincing evidence that excessive smoking for long periods commonly results in chronic inflammation of the respiratory tract.

Polypoid Degeneration of the Vocal Cords.—In 1950 Myerson⁵ described polypoid degeneration of the vocal cords as a clinical pathologic entity directly due to smoking. In his study of 143 patients he noted that the first stage was edema of the cords (Fig. 1A). This was followed by the development of smooth rounded polypoid masses or tumors (Figs. 1, B, C and D, and 2A). They were freely movable because of the thin sessile attachment. Histologically these tumors were edematous fibromas. The epithelium varied somewhat but usually was the normal stratified type of the free edge of the cord. The bulk of the tumor consisted of fibrous tissue in an edematous stroma (Fig. 2B). Myerson postulated that the local irritation of smoking first results in an outpouring of serum into Reinke's space. As a result of this chronic edema there was increased fibrosis, and finally a polypoid tumor developed.

This type of laryngeal tumor has been described by other observers under the terms "polypoid corditis," "chronic "

of the organism The experiments to be described in part II of this paper were designed to throw some light on the influence of cellophane as a dialysing membrane or as an adsorbing surface, and of agar, on the production of staphylococcus toxin The observations so far described, however, show that cultivation of the staphylococcus in a diffusate medium provides toxin which can be converted into toxoid of satisfactory antigenic potency and that these solutions contain considerably less non-specific matter than preparations derived from other media in common use

Part II The influence of various adsorbing surfaces on toxin production in a fluid medium

The possibility that broth inactivates a part of the toxin which is produced

Although there was no evidence that the broth used in this work adsorbed or inactivated the staphylococcus hæmolyysin it was necessary to eliminate this possibility A preliminary experiment was performed in which a fixed volume of a toxin of known strength was diluted with varying concentrations of broth from 5 to 100 per cent in saline Half of these mixtures were incubated at 37° C for 48 hours and the other half left in the cold room for the same period All the samples, together with control dilutions of the toxin in saline, were then tested for their hæmolytic activity There was no evidence that the presence of the broth in any concentration at either temperature had reduced the titre of the toxin

Following this experiment a volume of toxin of known strength was introduced into the diffusate in the cellophane bag and into the broth outside the bag so as to give a final dilution of one part of toxin in five of medium Several of these bottles were inoculated and incubated in the usual way, in some, the broth outside the bags was inoculated as well as the diffusate inside Control uninoculated bottles containing the same dose of toxin were incubated concurrently The titres of hæmolyysin which were obtained in the diffusates and in the broth were those that would be expected if the medium had no neutralising action on the added toxin There was no evidence that the broth inactivated part of the toxin produced by staphylococci growing in it, or that if toxin were added to the broth outside the bag, cultivation of the organism produced a further quantity of toxin

The influence of cellophane on the production of toxin

The observations described in part I of this paper suggested that a substance was present in the whole broth which inhibited the production of toxin by the staphylococcus and that this substance

des Gaumens und des Kehlkopfes wird als eine Folge des Rauchens angesehen.

Die Leukoplakie ist häufig ein Vorläufer des Krebses. Eine neue Überprüfung eines umfangreichen Materials führt zu der Schlussfolgerung, dass übermässiges Rauchen eine wichtige ursächliche Rolle in der Entstehung des Kehlkopfkrebss spielt.

RÉSUMÉ ET CONCLUSIONS

Les études de laboratoire et l'expérience clinique ont révélé que la fumée du tabac est irritante pour les muqueuses respiratoires.

Les inflammations chroniques non-spécifiques de la cavité buccale, du pharynx et du larynx, ainsi que la dégénérescence polypoïde des cordes vocales, sont courantes chez les gros fumeurs.

La leucoplasie de la bouche, de la langue, du palais et du larynx est considérée comme résultant de l'abus du tabac.

La leucoplasie est un précurseur du cancer. Il ressort d'études récentes que l'abus du tabac est un facteur causal important du cancer du larynx.

RESUMEN Y CONCLUSIONES

Los estudios de laboratorio y en experiencia clínica revelan que el humo del tabaco es irritante para la mucosa respiratoria.

Las observaciones clínicas confirmadas por recientes estudios histopatológicos, indican que la inflamación crónica no específica de la boca, faringe y laringe es común en personas que han fumado excesivamente durante años.

Existe evidencia clínica de que la degeneración polipoide de las cuerdas vocales resulta de la irritación causada por el humo del tabaco.

Fumar trae como consecuencia la leuco-

plasia de la boca, la lengua, el paladar y la laringe.

La leucoplasia es un precursor común de cáncer. Una encuesta exhaustiva hecha recientemente concluye que el excesivo fumar es un factor importante como causa del cáncer laríngeo.

REFERENCES

1. Finnegan, J. K.; Fordham, D.; Larson, P. S., and Haag, H. E.: A Quantitative Method for the Measurement of Cigarette Irritation, *J. Pharm. & Exper. Therapy* 89:115-124 (Feb.) 1947.
2. Proetz, A.: Some Preliminary Experiments in the Study of Cigarette Smoke and Its Effects upon the Respiratory Tract, *Laryngol.* 48:176-194 (March) 1939.
3. Ryan, R. F.; McDonald, J. R., and Devine, K. D.: The Pathologic Effects of Smoking on the Larynx, *Arch. Path.* 60:472-480 (Nov.) 1956.
4. Auerbach, O.; Petrick, T. G.; Stout, A. P.; Statsinger, A. L.; Muehsam, G. E.; Forman, J. B., and Gere, J. B.: The Anatomical Approach to the Study of Smoking and Bronchogenic Carcinoma, *Cancer* 9:76-83 (Jan.-Feb.) 1956.
5. Myerson, M. C.: Smoker's Larynx: A Clinical Pathological Entity, *Ann. Otol., Rhinol. & Laryngol.* 59:541-546 (June) 1950.
6. Myerson, M. C.: Observations and Considerations on Cigarette Smoking, *Ann. Otol., Rhinol. & Laryngol.* 64:412-417 (June) 1955.
7. Putney, F. J., and O'Keefe, J. J.: The Clinical Significance of Keratosis of the Larynx as a Pre-Malignant Lesion, *Ann. Otol., Rhinol. & Laryngol.* 62:348-357 (June) 1953.
8. LeJeune, F. E.: Surgical Treatment of Early Carcinoma of the Larynx, *Tr. Am. Laryngol., Rhinol. & Otol. Soc.* 55:318-325, 1951.
9. Cummer, C. L.: Leukoplakia (Leukokeratosis) of the Palate, Papular Form: Its Relation to the Use of Tobacco, *J.A.M.A.* 132:493-498 (Nov. 2) 1946.
10. Jackson and Jackson, C. L.: The Larynx and Its Diseases. Philadelphia and London: The W. B. Saunders Company, 1937, p. 370.
11. Lederer, F. L.: Diseases of the Ear, Nose and Throat. Philadelphia: The F. A. Davis Company, 6th ed., p. 1325.
12. Clerf, L. H.: Keratosis of the Larynx, *J.A.M.A.* 132:823-826 (Dec.) 1946.
13. New, G. B., and Erich, J. B.: Benign Tumors of the Larynx: A Study of Seven Hundred and Twenty-Two Cases, *Arch. Otolaryngol.* 28:841-910 (Dec.) 1938.
14. Friedberg, S. A., and Wallner, L. J.: Selected Problems in the Diagnosis of Laryngeal Carcinoma, *Arch. Otolaryngol.* 58:521-535 (Nov.) 1953.
15. Wynder, E. L.; Bross, I. J., and Day, E.: A Study of the Environmental Factors in Cancer of the Larynx, *Cancer* 9:86-110 (Jan.-Feb.) 1956.
16. Jackson and Jackson,¹⁰ p. 378.

of the organism The experiments to be described in part II of this paper were designed to throw some light on the influence of cellophane as a dialysing membrane or as an adsorbing surface, and of agar, on the production of staphylococcus toxin The observations so far described, however, show that cultivation of the staphylococcus in a diffusate medium provides toxin which can be converted into toxoid of satisfactory antigenic potency and that these solutions contain considerably less non-specific matter than preparations derived from other media in common use

Part II. The influence of various adsorbing surfaces on toxin production in a fluid medium

The possibility that broth inactivates a part of the toxin which is produced

Although there was no evidence that the broth used in this work adsorbed or inactivated the staphylococcus hæmolysin it was necessary to eliminate this possibility A preliminary experiment was performed in which a fixed volume of a toxin of known strength was diluted with varying concentrations of broth from 5 to 100 per cent in saline Half of these mixtures were incubated at 37° C for 48 hours and the other half left in the cold room for the same period All the samples, together with control dilutions of the toxin in saline, were then tested for their hæmolytic activity There was no evidence that the presence of the broth in any concentration at either temperature had reduced the titre of the toxin

Following this experiment a volume of toxin of known strength was introduced into the diffusate in the cellophane bag and into the broth outside the bag so as to give a final dilution of one part of toxin in five of medium Several of these bottles were inoculated and incubated in the usual way, in some, the broth outside the bags was inoculated as well as the diffusate inside Control uninoculated bottles containing the same dose of toxin were incubated concurrently The titres of hæmolysin which were obtained in the diffusates and in the broth were those that would be expected if the medium had no neutralising action on the added toxin There was no evidence that the broth inactivated part of the toxin produced by staphylococci growing in it, or that if toxin were added to the broth outside the bag, cultivation of the organism produced a further quantity of toxin

The influence of cellophane on the production of toxin

The observations described in part I of this paper suggested that a substance was present in the whole broth which inhibited the production of toxin by the staphylococcus and that this substance

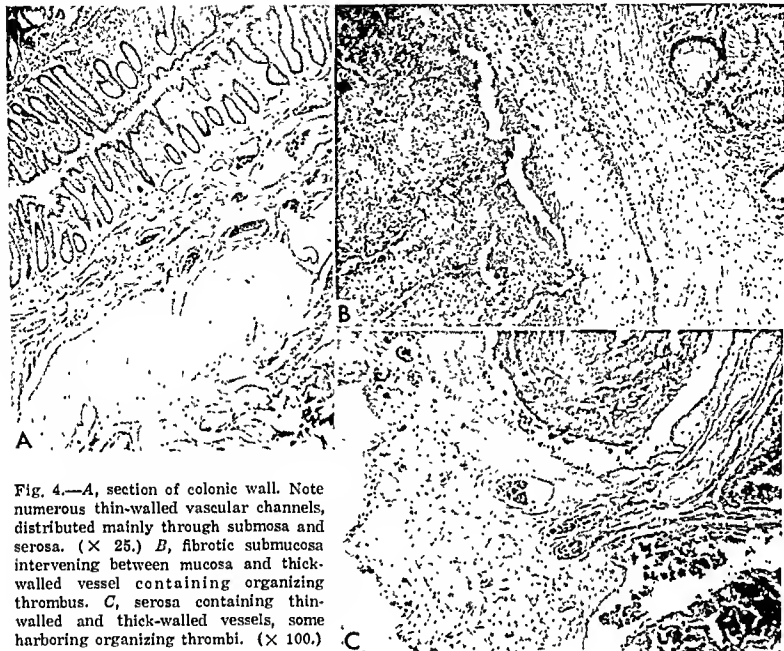


Fig. 4.—A, section of colonic wall. Note numerous thin-walled vascular channels, distributed mainly through submucosa and serosa. ($\times 25$.) B, fibrotic submucosa intervening between mucosa and thick-walled vessel containing organizing thrombus. C, serosa containing thin-walled and thick-walled vessels, some harboring organizing thrombi. ($\times 100$.)

sented smooth serosal surfaces. Coursing throughout the mesenteric tissue were prominent vascular channels. These vessels were tortuous, and the lumens of some contained clots suggesting thrombi. Some of the vessels measured as much as 3 mm. in diameter, and most had relatively thin walls. Vascularity appeared to be contiguous with vessels entering the serosa of the large bowel wall. Exposure of the intestinal lumen demonstrated rather extensive focal modification of the mucosa. The mucosal rugae were broadened and irregular with an almost nodular appearance in some areas (Fig. 3). Individual mucosal processes varied from 2 to 4 mm. in width. Intervening patches of mucosa showed no remarkable alteration. No undue vascularity of the submucosa in uninvolved areas was recognized grossly. The involved mucosa had a distinctly bluish appearance. Sections through

the mucosa suggested ectasia of vascular structures within the submucosa, as well as increased vascularity. The bowel wall was thickened from 5 to 8 mm. (including the serosa) in some areas where vascularity was most prominent. An estimated 60 to 75 per cent of the entire mucosal surface of the bowel showed this alteration in structure and pigmentation. Focal areas of hemorrhage measuring up to 2 cm. in diameter were scattered through the attached mesenteric tissue. This mesenteric tissue appeared edematous, and tortuous vessels, similar to those encountered within the bowel wall proper, were observed. The shorter two segments of bowel, measuring 5 and 6 cm. respectively, showed mild edematous and echymotic serosal fat and minor modifications of the mucosa similar to those observed in the longest segment.

Microscopic: Microscopic sections of the

[illegible]

The first of these is the fact that the
 Government has been unable to secure
 the necessary funds to carry out its
 policy of non-interference. This has
 been due to a variety of factors, including
 the fact that the Government has been
 unable to secure the necessary funds
 to carry out its policy of non-interference.
 This has been due to a variety of factors,
 including the fact that the Government
 has been unable to secure the necessary
 funds to carry out its policy of non-
 interference. This has been due to a
 variety of factors, including the fact
 that the Government has been unable to
 secure the necessary funds to carry out
 its policy of non-interference. This has
 been due to a variety of factors, including
 the fact that the Government has been
 unable to secure the necessary funds to
 carry out its policy of non-interference.

[illegible]

In eight out of eleven experiments the diffusate in the cellop

g and in fast
ad been reme
s were inocu
during incub
in broth ex

of toxin
t obtained
e the toxi

sont passés en revue. L'auteur décrit un cas mixte d'hémangiomatose caverneuse et capillaire du colon et du rectum, présentant en outre des lésions similaires dans différents autres organes. L'opération a consisté en une hémicolectomie et une proctosigmoïdectomie abdomino-périnéale, avec anastomose du colon transverse et de la partie inférieure du rectum, selon la technique de Swenson.

REFERENCES

1. Bacon, H. E.: Anus, Rectum and Sigmoid Colon; Philadelphia: The J. B. Lippincott Company, 1949.
2. Lazaras, L. A., and Marks, M. S.: Intestinal Tumors of Vascular Origin, *Surgery* 22:766-779, 1947.
3. Gentry, R. W., Dockerty, R. B., and Clagett, O. T.: Vascular Malformations and Vascular Tumors of the Gastro-Intestinal Tract, Surg., Gynec. & Obst. (International Abstract by Surgery) 58: 281-323, 1949.
4. Shepherd, J. A.: Angiomatous Conditions of the Gastro-Intestinal Tract, *Brit. J. Surg.* 40:409-421, 1953.
5. Fraser, J.: *Brit. J. Surg.* 7:335, 1919.
6. Brown, A. J.: Vascular Tumors of the Intestine, Surg., Gynec. & Obst. 39:191-199, 1924.
7. Hunt, V. C.: Hemangioma of Large Bowel, *Surgery* 10:651-660, 1941.
8. Heycock, J. B., and Dickinson, P. H.: Hemangioma of the Intestine, *Brit. M. J.* 1:620-621, 1951.
9. Jaques, A. A.: Cavernous Hemangioma of the Rectum and Rectosigmoid Colon, *Am. J. Surg.* 84:507-509, 1952.
10. Kausch, W.: Ueber Varicose and Cavernose des Mastdarms, *Verhandl. d. deutsch. Gesellsch. Chir.* 43:243-245, 1914.
11. Buie, L. A., and Swan, T.: Benign Tumors of the Colon, *S. Clin. North America* 9:893-910, 1929.
12. Kaijser, R.: Diagnosis of Cavernous Hemangioma of Gastrointestinal Canal, *Nord. Med. Tidsskr.* 12:1199, 1936.
13. Sawyer, C. F.: Hemangioma of the Colon, *Arch. Surg.* 39:987-991, 1939.
14. Babcock, W. W., and Jonas, K. C.: Hemangioma of the Colon, *Am. J. Surg.* 80:854-859, 1947.

The Tenth International Congress
of the
INTERNATIONAL COLLEGE OF SURGEONS

by invitation of His Excellency Don Adolfo Ruiz Cortines,
President of the Republic of Mexico

will be held at University City, Mexico, D. F., on

February 24 to 28, inclusive, 1957

For further information, please address Secretariat, International
College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois.

of these samples of broth. On the other hand, when the organism was incubated at the same time in samples of the same broth from which the precipitate had been separated, no toxin could be detected in eight out of eleven samples, while the hæmolysin obtained in the remaining three samples was extremely feeble. It appears that the phosphate precipitate provides a surface which exerts an influence on toxin production similar to but more feeble than that exerted by cellophane. Unlike cellophane, however, the phosphate precipitate exerts its action only when it is present during the multiplication of the organism.

The influence of kieselguhr

Broth which had been sterilised in the autoclave to remove the precipitable phosphates was mixed with powdered kieselguhr in the proportion of approximately 1 g of kieselguhr to 100 c c of broth and the mixture kept at room temperature for eighteen hours with occasional shaking. The kieselguhr was removed by centrifugation and the broth then distributed in 50 c c amounts in Erlenmeyer flasks, inoculated with culture and incubated for the usual period of 48 hours. In each experiment control cultures

TABLE XI

Toxin production in broth treated with kieselguhr

Batch	Incubation in cellophane bag	Broth treated with kieselguhr		Untreated broth
		Kieselguhr present during incubation	Kieselguhr removed before inoculation	
39	0.075		0.075	
43	0.2		0.2	<1.0
44	0.2		<1.0	<1.0
47	0.1	<1.0	0.1	<1.0
50	0.08	<1.0	0.08	0.3
53	0.15	0.7	0.15	<1.0
55	0.125		<1.0	<1.0
56	0.125		0.4	<1.0
57	0.2		0.15	<1.0
63	0.1		0.08	0.75
64	0.15		0.4	0.5

Figures show the Lh dose in c c

were set up in the diffusate in a cellophane bag and in flasks of broth from which the phosphate precipitate had been removed. In three of these experiments additional flasks were inoculated in which the kieselguhr was left in the broth during incubation of the organism. The results of all the cultures in broth exposed to kieselguhr are included in table XI.

In eight out of eleven experiments the yield of toxin from broth treated with kieselguhr was as good as that obtained from the diffusate in the cellophane bags, in one culture the toxin was

ção. A correção pode ser feita por descolamento das regiões gluteas e nova formação do sulco interglúteo. O A. discute um método de tratamento para a lesão inicial. Tal método assegura uma cicatrização rápida, permanência mínima no hospital e menor incidência de complicações.

SCHLUSSFOLGERUNGEN

Der "Rückfall" pilonidaler Erkrankung nach Resektion des befallenen Gebietes ist eine Komplikation der ursprünglichen Operation und nicht ein neues Auftreten der Krankheit. Die Einschränkung der Bewegung der durch übermässige Narbenbildung fixierten Gesässbacken und der Verlust eines Teiles der Gesässfalte kann zu einer Zerreissung der Narbe führen. Eine Infektion der Narbe ruft die Entstehung einer sezernierenden Fistel hervor, die der ursprünglichen Erkrankung ähnelt. Weitere Opferung von Gewebe verschlechtert die Aussichten auf Heilung. Der Schaden kann durch Befreiung der Gesässbacken und Wiederherstellung der interglutäalen Spalte beseitigt werden. Es wird ein bewährtes Verfahren zur Behandlung der ursprünglichen Erkrankung erörtert. Diese Methode sichert eine rasche Heilung mit äusserst geringer Dauer des Krankenhausaufenthalts und

mit verbesserten Aussichten auf das Ausbleiben von Komplikationen.

CONCLUSION

La "recidiva" de la enfermedad pilonidal después de la excisión del área que la contiene, es una complicación de la operación original y no una verdadera recidiva. La ruptura de la cicatriz es posible debido al movimiento limitado de las nalgas por el mismo exceso de cicatriz y por la pérdida de parte del tejido graso.

La infección de la cicatriz origina la formación de un seno de drenaje que semeja la lesión original. El sacrificio de más tejido empeora la posibilidad de curación. La corrección puede lograrse liberando las nalgas reformando el surco interglúteo. Un método comprobado de tratamiento para la condición inicial se discute. Este método asegura curación rápida, hospitalización mínima y mínimo de complicaciones.

REFERENCES

1. Marks, M. M.: Repair of Painful Sacral Scars, *Southern M. J.* 42:319-323, 1949.
2. Buie, L. A.: Jeep Disease: Pilonidal Disease of Mechanized Warfare, *Southern M. J.* 37:103, 1944. Granet, E., and Ferguson, L. K.: Pilonidal Disease, *J.A.M.A.* 70:139, 1945. Zimmerman, K.: Pilonidal Disease, *Tr. Am. Proctologic J.* 45:515, 1947. Marks, M. M.: Pilonidal Disease: Treatment by Eventration, *Southern M. J.* 40:844-848, 1947.

No physician, insofar as he is a physician, considers his own good in what he prescribes, but the good of his patient; for the true physician is also a ruler, having the human body as a subject, and is not a mere money-maker.

—Plato

from the broth or left *in situ* during incubation Presumably the toxin is not adsorbed by this substance

Calcium sulphate was selected for experiment because it carries a charge opposite to that borne by kieselguhr, kaolin and silica gel There is no evidence that calcium sulphate promotes the production of toxin in broth "Norit" charcoal and sliced potato also failed to adsorb the inhibitory factor from the broth

In four experiments out of five, filter paper, when left in the broth during incubation, promoted the production of toxins as good as or better than that produced in the control cultures in the diffusate In one experiment filter press cloth produced a similar effect

Since it is known that the addition of agar to a broth medium will facilitate the production of toxin by the staphylococcus, it was of some interest to determine whether preliminary exposure of the broth to agar promotes the formation of toxin after the agar has been removed Observations were made in which the broth was exposed to 1.5 per cent and 6 per cent of agar, the agar was removed by filtration through paper and the broth then sterilised and inoculated There was no evidence that this treatment promoted toxin production and it appears either that the action of agar must be exerted during the multiplication of the organism, or that it is necessary for the agar to be present in the form of a gel

It is apparent from these observations that various materials which provide efficient adsorbing surfaces fix and inactivate some constituent from broth which inhibits the production of toxin by the staphylococcus When broth has been treated in this way it is no longer necessary to incorporate a proportion of agar in the medium in order to obtain potent toxin

Cultures in large volumes of the diffusate

Cultures in cellophane bags, each containing about 35 c.c. after dialysis, are not convenient for the preparation of large volumes of toxin for conversion into toxoid and for general routine use The assembling and sterilisation of the apparatus involves time and labour out of proportion to the final volume of toxin obtained There seemed to be no reason why dialysis should not be carried out in bulk, the diffusate being separated into bottles of convenient size, autoclaved and then inoculated with culture During the course of this work many attempts were made to adapt the experimental method to the production of toxin in bulk Our earlier attempts met with complete failure which was difficult to explain in the light of the hypothesis that differential osmosis through cellophane was responsible for toxin production in the diffusate When it was realised that the cellophane exerted a

may have been overlooked at operation. New granulations are visible to the naked eye in about one week, and epithelial proliferation is apparent soon afterward.

The great majority of patients in the series had not undergone previous definitive surgical treatment (Table 1). Twenty-nine per cent underwent the definitive operation in the presence of an acute abscess.

It was possible to determine the exact healing time required by 39 patients. The average healing time in those cases where operation was performed in the presence of an acute abscess was much longer than in those cases where no acute abscess was present (Table 2). Unroofing (excision of the outer walls of the cyst) was followed by a much longer healing period than was exteriorization alone.

Accordingly, I have now adopted the procedure of treating acute abscess by a very small incision; when evidence of acute inflammation has disappeared, the definitive operation is performed. Unroofing is no longer included in the operation. Twenty-six patients who did not have acute abscess were treated by exteriorization alone. The average healing time in these patients was fifty-one days. The mean healing time was forty days.

It was possible to do follow-ups on 39 patients who had undergone operation one or more years prior to compilation of the data (Table 3). The recurrence rate was 2.6 per cent.

The operative scars after exteriorization were narrow, soft and freely movable. No patient complained of a painful scar.

SUMMARY AND CONCLUSIONS

The rationale, historical background and technic of an exteriorization operation for pilonidal disease are briefly reviewed.

A small series of cases in which this condition was treated by a simple, conser-

vative exteriorization procedure is presented.

In the author's opinion the exteriorization procedure has value, at least in cases in which no definitive operation has been performed.

The author makes no attempt to minimize the value of total excision. The exact indications for each type of operation should be determined through further investigation.

RÉSUMÉ ET CONCLUSIONS

L'auteur analyse brièvement les causes et expose la technique d'extirpation chirurgicale de l'affection pileuse. Il présente quelques cas personnels traités par simple extériorisation conservatrice. L'auteur accorde une certaine importance à cette technique, tout au moins dans les cas où il n'y a eu aucune opération antérieure, sans toutefois minimiser la valeur de l'excision totale. Les indications exactes pour chaque type d'opération devraient pouvoir être posées grâce à des recherches plus poussées dans ce domaine.

RESUMEN Y CONCLUSIONES

Se revisan brevemente el razonamiento, la historia y la técnica de una operación de extirpación para la enfermedad pilonidal.

Se presenta una pequeña serie de casos en los cuales ésta condición fué tratada por un procedimiento simple de extirpación conservadora.

En la opinión del autor el procedimiento de extirpación tiene valor, por lo menos en casos en los cuales una operación definitiva no ha sido efectuada previamente.

El autor no trata de reducir el valor de la excisión total. La indicación exacta para cada tipo de operación debe determinarse en futuras investigaciones.

from the broth or left *in situ* during incubation Presumably the toxin is not adsorbed by this substance

Calcium sulphate was selected for experiment because it carries a charge opposite to that borne by kieselguhr, kaolin and silica gel There is no evidence that calcium sulphate promotes the production of toxin in broth "Norit" charcoal and sliced potato also failed to adsorb the inhibitory factor from the broth

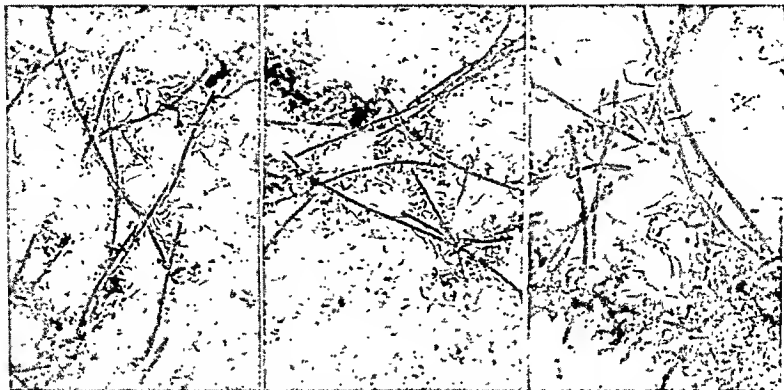
In four experiments out of five, filter paper, when left in the broth during incubation, promoted the production of toxins as good as or better than that produced in the control cultures in the diffusate In one experiment filter press cloth produced a similar effect

Since it is known that the addition of agar to a broth medium will facilitate the production of toxin by the staphylococcus, it was of some interest to determine whether preliminary exposure of the broth to agar promotes the formation of toxin after the agar has been removed Observations were made in which the broth was exposed to 1.5 per cent and 6 per cent of agar, the agar was removed by filtration through paper and the broth then sterilised and inoculated There was no evidence that this treatment promoted toxin production and it appears either that the action of agar must be exerted during the multiplication of the organism, or that it is necessary for the agar to be present in the form of a gel

It is apparent from these observations that various materials which provide efficient adsorbing surfaces fix and inactivate some constituent from broth which inhibits the production of toxin by the staphylococcus When broth has been treated in this way it is no longer necessary to incorporate a proportion of agar in the medium in order to obtain potent toxin

Cultures in large volumes of the diffusate

Cultures in cellophane bags, each containing about 35 c.c. after dialysis, are not convenient for the preparation of large volumes of toxin for conversion into toxoid and for general routine use The assembling and sterilisation of the apparatus involves time and labour out of proportion to the final volume of toxin obtained There seemed to be no reason why dialysis should not be carried out in bulk, the diffusate being separated into bottles of convenient size, autoclaved and then inoculated with culture During the course of this work many attempts were made to adapt the experimental method to the production of toxin in bulk Our earlier attempts met with complete failure which was difficult to explain in the light of the hypothesis that differential osmosis through cellophane was responsible for toxin production in the diffusate When it was realised that the cellophane exerted a



Colonies de *Leptothrix* prélevées sur les amygdales de Madame P, 48 ans atteinte de mycose pharyngée et génitale.

prolifération des points blancs fut telle qu'on en fit un prélèvement. Il montra des éléments mycéliens : *Leptothrix*. Un traitement local iodé fut installé, fidèlement suivi. Cela n'empêcha pas la propagation à la base de la langue qui devenait gênante. Je dus procéder au cours des vacances de Pâques à l'amygdalectomie, qui entraîna la régression et la disparition de l'amygdalite linguale.

Une jeune femme de 24 ans, indemne d'un passé amygdalien, s'est reconnue atteinte de mycose, contrôlée aussi microscopiquement. Désirant éviter les séances de diathermo coagulation que je lui avais proposée, elle s'est soumise à des badigeonnages intensifs de "Mycodécil," fungicide à base d'acide undecynélique, qui eurent raison définitivement de l'amygdalite à *Leptothrix*.

Une malade de 48 ans, atteinte de rhume des foin, avait bénéficié de quelques séances de phenolisisation nasale, quelques mois auparavant. Elle revint me consulter, ayant aperçu, depuis quelques jours, sur sa gorge des filaments longs et épais, qui

prenaient un développement très envahissant.

Je prélevais à la pince un fragment de muqueuse avec son clou. Le laboratoire me rendit compte de la présence de *Leptothrix* sur les coupes et les frottis. En joignant les microphotographies que nous reproduisons, le même laboratoire signalait que cette personne était atteinte de vaginite mycosique à *Leptothrix*; des éléments mycéliens identiques avaient été antérieurement découverts sur les frottis de sécrétion génitale.

Trois séances de diathermie suffirent à déterger les amygdales d'une véritable forêt de poils mycosiques.

L'étrangeté de cette affection, mystérieuse dans son étiologie, s'accroît de la bizarrerie de ses réactions à la thérapeutique.

S'il s'agissait d'un simple ensemencement mycélien, les applications iodées ou divers fungicides, suffiraient à le détruire. Or il n'en est rien la plupart du temps. Chez l'enfant, les collutoires les plus divers, y compris le "Mycodécil," ont été

with the staphylococcus This proved to be true In a limited number of experiments in which cellophane was added to the diffusate in this way toxins of reasonable potency were obtained, whereas control flasks without added cellophane contained little or no toxin

Throughout these observations on toxin production in large volumes of diffusate, control cultures were made in small bags by the original method Whereas the control cultures consistently yielded toxins of an *Lh* value varying between 0.08 and 0.15 c c, no large volume culture yielded toxin with an *Lh* value of less than 0.15 c c, the values obtained ranging between this figure and 0.25 c c It is clear therefore that all the factors involved in toxin production in a large volume have not so far been controlled

In this connection it may be noted that the influence of cellophane upon toxin production by the staphylococcus is not confined to cultivation in Bigger's medium In a limited number of experiments with the medium of Parish and Clark (1932) it has been found that cellophane may be substituted for agar in the same way Miss Llewellyn Smith also informs me that she has substituted chopped crumpled cellophane for agar in the semi-synthetic medium of Leonard and Holm (1935) with similar results, in two experiments with this medium, employing 250 c c amounts in Winchester bottles incubated in the horizontal position, the *Lh* value of the toxins produced in the presence of agar were 0.05 and 0.07 c c, with cellophane 0.22 c c, without agar or cellophane 1.3 and 1.6 c c

Discussion of part II

The experiments described in the second part of this paper demonstrate that the yield of staphylococcus toxin obtained in the cellophane bag is not due to differential osmosis of the various broth constituents through the cellophane membrane The function of the cellophane is to provide a surface which adsorbs and removes some constituent of the broth which inhibits the production of toxin, though it does not adversely affect the multiplication of the staphylococcus This constituent of the broth has not so far been isolated and it is not known whether it exerts its action by direct inhibition of toxin formation by the organism, or whether it enables the staphylococcus to secrete some enzyme which itself destroys the toxin It has been shown, however, that broth does not itself fix or neutralise any toxin that is added to it

Experiments with cellophane and other adsorbent surfaces indicate that they need not be present during the incubation of the organism in the broth, provided the broth has been exposed to the surface in question before inoculation, the adsorbent may be removed before incubation Thus the adsorbent action is not

Sur un Cas de Foster-Kennedy Syndrome par Compression du Troisième Ventricule

G. JULES VERNE, M.D.

PAPEETE, TAHITI

Le territoire tahitien n'est pas grand : la population entière des Etablissements Français de l'Océanie ne doit guère excéder soixante mille âmes. Et, cependant, à côté d'un bilan sanitaire satisfaisant en général on y rencontre une diversité pathologique assez remarquable.

Voici, à ce propos, l'histoire d'un habitant de Taravao, dont l'aventure vient de trouver, à Honolulu, son épilogue, un épilogue honorable, sans doute mais que des moyens d'investigation plus précis nous auraient permis d'écrire plus tôt et de plus heureuse manière.

Le début progressif, de l'histoire clinique de Tuaiva T....., cultivateur, âgé de 41 ans, paraît remonter à deux ans environ, par des céphalées transitoires, à localisation essentielle fronto-orbitaire gauche, sourdes, exacerbées au début de la nuit, et nettement accentuées par l'effort et les mouvements de la tête.

En même temps, apparaît avec la perte de l'appétit, un amaigrissement progressif.

Les choses demeurent en l'état pendant six mois environ, puis, de transitoires, les céphalées deviennent permanentes, accompagnées de sensations de battements, cependant que l'acuité visuelle demeure intacte.

En janvier 55, l'évolution paraît se précipiter : l'acuité visuelle décline rapidement à G, tandis que les céphalées, de plus en plus intenses, ne laissent au malade aucun répit. L'apparition, en février de sensation de déséquilibre, décide le malade

à se présenter à la Consultation de l'Hôpital de Taravao (Dr. Castorene), où un syndrome d'hypertension intracranienne, cliniquement suspecté est biologiquement confirmé par une dissociation albuminocytologique du L. C. R.

Une stase papillaire bilatérale, reconnue à la Consultation Ophtalmologique de l'Hôpital de Papeete, décide de l'hospitalisation du malade dans cette formation, le 15 mars 1955.

Une enquête rapide dans les antécédents du malade ne révèle, en dehors d'une fracture de la jambe droite dans l'enfance et de la clavicule gauche à l'âge de 37 ans, que la notion d'Asthme dont le malade souffre depuis l'âge de 10 ans.

Aucun élément notable dans le passé pathologique de ses parents ni de ses collatéraux : aucune notion d'acromégalie, en particulier.

À l'entrée, le malade est apyrétique, se plaignant seulement de céphalées incessantes qui seront d'ailleurs rapidement calmées par le sulfate de Magnésique.

L'examen du malade révèle que son acuité visuelle est égale à 0,7 à dr mais seulement à 0,4 à gauche.

La tonométrie montre une tension oculaire égale à 25 des deux côtés !

Les réflexes pupillaires sont paresseux, tandis que la transparence des milieux réfringents est normale.

L'examen du F.O montre :

1) *a droite* : Le disque apparaît soulevé par l'œdème qui déborde largement les frontières et ondule en plis la rétine péri-

duced in the diffusate compares favourably with that obtained from other media in general use. The relative significance of different tests for estimating the antigenic potency of toxoids is discussed. Toxins prepared in the diffusate and toxoids derived from them contain considerably less non-specific matter than those obtained from other media.

4 Differential osmosis through cellophane is not the factor which enables the staphylococcus to produce toxin in a fluid medium. Cellophane acts as an adsorbing surface which removes some substance, so far unidentified, from the broth. This substance does not adversely influence multiplication of the organism, but it inhibits toxin production. Cellophane acts on the medium and not upon the multiplying organism or its products.

5 If broth is exposed to other surfaces such as kieselguhr, kaolin and filter paper, these also will enable the staphylococcus to produce toxin in a fluid medium. The action of agar as an adsorbent surface favourable to toxin production is discussed.

It is a pleasure to thank Dr H. J. Parish for the supply of cultures and particulars as to their maintenance, Mr C. G. Pope for his interest and suggestions and Miss Llewellyn Smith for her criticism and help with many confirmatory titrations of samples of toxin and toxoid.

REFERENCES

- | | | |
|------------------------------------|---------|---|
| ASHESHOV, I. N., ASHESHOV, I., | 1932-33 | <i>Ind J Med Res</i> , xx 1101 |
| KHAN, S., AND LAHIRI, M. N. | | |
| BIGGER, J. W. | 1933 | this <i>Journal</i> , xxxvi 87 |
| BIRCH HIRSCHFELD, L. | 1933-34 | <i>Z. Immunitätsforsch.</i> , lxxxix 260 |
| BURNET, F. M. | 1929 | this <i>Journal</i> , xxxii 717 |
| " | 1930 | this <i>Journal</i> , xxxiii 1 |
| " | 1931 | this <i>Journal</i> , xxxiv 471 |
| GLENNY, A. T., AND STEVENS, M. F. | 1935 | this <i>Journal</i> , xl 201 |
| HOLT, L. B. | 1936 | <i>Brit J Exp Path.</i> , xvii 318 |
| LEONARD, G. F., AND HOLM, A. | 1935 | <i>J Immunol.</i> , xxix 209 |
| NEISSER, M., AND WECHSBERG, F. | 1901 | <i>Z. Hyg.</i> , xxxvi 299 |
| PARISH, H. J., AND CLARK, W. H. M. | 1932 | this <i>Journal</i> , xxxv 251 |
| PARKER, J. T. | 1924 | <i>J Exp Med.</i> , xl 761 |
| POPE, C. G. | 1932 | <i>Brit J Exp Path.</i> , xiii 207 |
| POPE, C. G., AND SMITH, M. L. | 1932 | this <i>Journal</i> , xxxv 573 |
| SMITH, M. L. | 1936 | this <i>Journal</i> , xli 227 |
| WORTH, M. C. | 1919 | <i>J Bact.</i> , iv 603 |

grown, immersed in inactivated normal horse serum, agitated in it for one hour and removed by centrifugation and filtration. The serum is then found to be both strongly hæmolytic for red cells and toxic for mice. In a recent paper Schluter and Schmidt (1936), besides confirming Weld's statement that such preparations are toxic for mice, also showed that they are toxic for guinea-pigs and rabbits.

There can thus be little doubt that hæmolytic streptococci possess, probably on their surface, a heat-labile toxin which can by appropriate methods be liberated into solution. This may or may not be the hæmolysin.

The present paper is an account of a study of these toxins. It will be shown that it is possible to produce a toxin for mice by the filtration of serum broth cultures but that a much more potent toxin may be obtained by the method of Weld, that such preparations are strongly hæmolytic and that characteristic post-mortem appearances are usually seen in animals which have died following its injection. The properties of the toxin and the technique employed for its production have also been studied.

EXPERIMENTAL PROCEDURES

In Weld's experiments the organisms derived from the pleural cavity of a rabbit previously infected with the strain under investigation were grown for 13 hours in a heavily buffered veal digest medium containing a relatively large amount of Witte peptone. The medium as described by Weld had to be centrifuged twice in order to clear it, since, according to her, filtration of any sort was inadvisable. Needless to say this is very troublesome. In preliminary experiments more easily prepared media such as Douglas's trypsin digest with added buffers, infusion broth with buffers, and Swift and Hodge's (1932-33) medium without glucose were employed, but the resulting extracts made by Weld's method were atoxic. Attempts were therefore made to simplify the preparation of Weld's medium. These attempts were successful, and I have been able to obtain very toxic and strongly hæmolytic extracts from organisms grown in a medium whose preparation is fundamentally that described by Weld but considerably simplified.

Preparation of medium

Two pounds of veal are minced and placed in 850 c.c. of distilled water and allowed to infuse for 2-3 days. The solid particles are then removed by straining through butter muslin. Forty g. of Witte peptone are then added and the whole is brought to a temperature of 70° C., at which it is maintained for 10 minutes. It is then adjusted to a pH of 4.8 and placed in the steamer for 30 minutes in a flask equipped with a syphon tube. Immediately on removal from the steamer and without any preliminary cooling 100 c.c. of distilled water containing 2 g. of NaHCO_3 and 1 g. of $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$ (Seitz filtered) are added and the reaction adjusted with sterile *N* NaOH to bring the pH to 8.1. The precipitates which are formed during these manœuvres are then allowed to settle while the medium cools.

Thirty c.c. quantities of the supernatant fluid are then syphoned off into sterile 12 x 1 in. tubes, each of which has previously had added to it one

termédiaire d'autres formations endocraniennes.

SUMMARY

A meningioma of the dura mater and falx cerebri compressing the third ventricle and causing internal hydrocephalus by blocking the aqueduct of Sylvius, constitutes the object of this report.

In this particular case the floor of the distended ventricle, encroaching upon the optic chiasm, also exercised a pressure on the left optic nerve and induced a Foster-Kennedy syndrome.

Operation, performed by Dr. Cloward

in Honolulu, produced immediate alleviation of the subjective symptoms and recovery of useful visual acuity.

The various causes of the syndrome are reviewed and the diagnostic data specified, with particular emphasis on the polymorphism of perimetric defects in such cases. It is stressed that the conspicuous value of localization of the Foster-Kennedy syndrome is to give evidence of pressure at the level of the anterior fossa, this pressure originating either from a space-taking lesion at the level or, as in the present case, from a remote tumor through the channel of some intracranial component part.

I have recently read, with mingled sadness and surprise, the declarations of some surgeons that anesthetics are needless luxuries, and that unendurable agony is the best of tonics. Those surgeons, I think, can scarcely have been patients of their brother surgeons, and jest at scars only because they never felt a wound; but if they remain enemies of anaesthetics after what you have written, I despair of convincing them of their utility . . .

As for the fear entertained by some, that the moral good which accrues from suffering, and is intended by the Ruler of all to be secured by it, will be lost if agony is evaded by sufferers having recourse to anaesthetics, we may surely leave that to the disposal of Him who does all things well. The best answer to such complaints I have heard, was given by an excellent old lady to another, who was doubting whether any of the daughters of Eve were at liberty to lessen by anaesthetics the pangs of child-bearing: "You need not be afraid," said the wiser lady, "that there will not be enough suffering in the world."

—Simpson

Hæmolytic tests

Dilutions of the extracts are made in normal salt solution (in 100 c mm amounts) and an equal volume of 5 per cent washed horse red cells added. The mixtures are incubated in a water bath at 37° C and the highest dilution giving complete hæmolysis at the end of 2 hours taken as the end point.

RESULTS

In the first experiment the presence of a heat-labile toxin in (1) filtrates of serum broth and plain broth cultures and (2) serum extracts of the organisms from the same cultures was investigated. The preparations were all injected intravenously, as soon as possible after they had been made, into mice weighing 15 to 20 g. Samples after heating at 56° C for 60 minutes were also injected, as well as a control sample of the inactivated horse serum employed in the experiment.

Experiment One hundred and twenty c c of modified Weld broth and 120 c c of modified Weld broth containing 30 per cent normal horse serum (which had been previously inactivated by heat at 56° C for 40 minutes) were inoculated with 200 c mm of a three hour culture in serum broth of a dried culture of strain Gay. The tubes were placed in the incubator for 16 hours. Both cultures then had an opacity equal to tube number 3 on Brown and Kirwan's scale. The pH of both was 7.5. Both cultures were centrifuged at 4000 r p m for 15 minutes. The supernatant fluids were removed and 60 c c of each filtered through a Sertz EK disc. Extracts of the deposited organisms themselves were made by the method already described. Two c c of both filtrates and both extracts were heated at 56° C for 60 minutes and mice injected intravenously with various doses of each. The hæmolytic titre for horse red cells of all the preparations was also determined. The results are given in table I.

This experiment shows that a heat-labile toxin cannot be obtained by filtration of a plain broth culture, but can be obtained from a serum broth culture, as was shown by Channon and McLeod, or by the agitation of the organisms derived from either a plain or serum broth culture in previously inactivated horse serum. It is, however, of very considerable interest and importance that the toxicity of the various preparations varied considerably. The filtrate of the plain broth culture contained no toxin at all, that of the serum broth culture was toxic but weak. Both the extracts made by agitation of the organisms themselves in horse serum were very much more toxic, but that made from organisms grown in serum broth was weaker than that made from organisms grown in plain broth. The toxicity and hæmolytic power of all the preparations was destroyed by heat at 56° C for 60 minutes.

It would therefore seem that there is attached to the bodies of hæmolytic streptococci a heat-labile toxic substance which is soluble in inactivated horse serum. If serum be present in the

ble la extracción y necesario el practicar incisiones para extraer el vaso en dos o tres tiempos. El corte de la copa va diseccionando el tejido perivenoso y seccionando las colaterales; la vena se introduce dentro de la copa, a excepción de su cuarta parte superior, de tal suerte que sale limpia, (pelada), y se tiene la impresión de que ha dejado un tunel pequeño, se ha hecho un traumatismo minimun, y la hemorragia es despreciable. Nunca he tenido complica-

ciones que lamentar, y los pacientes dejan el Hospital a los seis u ocho dias.

SUMMARY

The author presents descriptions and drawings of a new phlebodissector he has found useful in excision of the internal saphenous vein. His operative technic is described in detail, with instructions as to the proper use of the phlebodissector.

IMPORTANT NOTICE TO ALL CONGRESS PARTICIPANTS

Those desiring their Congress presentations to appear later as articles in the Journal of the International College of Surgeons, please note:

1. A full copy of the manuscript, together with all illustrations, legends, tabular matter and bibliographic references, should be sent DIRECT to the Editorial Office, Journal of the International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois. Manuscripts so submitted will be promptly acknowledged and, on acceptance by the Editorial Board, published as soon after the Congress as possible. The Journal cannot be held responsible for loss, failure of acknowledgment, delay in publication or nonpublication of any manuscript, or any subsidiary material appertaining thereto, which has not been submitted through the official editorial channels.

2. Manuscripts may be submitted in advance of the Congress if desired. When this is done, they should be plainly marked with the name, place and date of the Congress concerned, to guard against premature publication.

3. Manuscripts delivered in person to Congress officials or others for press reportorial use only should be sent by the recipient to the Public Relations Bureau.

These requests are made not only to safeguard the Journal from error but in the best interests of our contributors. To make sure of prompt acknowledgment and efficient handling of your Congress presentation, please send it DIRECT to its ultimate destination!

Hæmolytic tests

Dilutions of the extracts are made in normal salt solution (in 100 c.mm amounts) and an equal volume of 5 per cent washed horse red cells added. The mixtures are incubated in a water bath at 37° C and the highest dilution giving complete hæmolysis at the end of 2 hours taken as the end point.

RESULTS

In the first experiment the presence of a heat-labile toxin in (1) filtrates of serum broth and plain broth cultures and (2) serum extracts of the organisms from the same cultures was investigated. The preparations were all injected intravenously, as soon as possible after they had been made, into mice weighing 15 to 20 g. Samples after heating at 56° C for 60 minutes were also injected, as well as a control sample of the inactivated horse serum employed in the experiment.

Experiment One hundred and twenty c.c. of modified Weld broth and 120 c.c. of modified Weld broth containing 30 per cent normal horse serum (which had been previously inactivated by heat at 56° C for 40 minutes) were inoculated with 200 c.mm. of a three hour culture in serum broth of a dried culture of strain Gay. The tubes were placed in the incubator for 16 hours. Both cultures then had an opacity equal to tube number 3 on Brown and Kirwan's scale. The pH of both was 7.5. Both cultures were centrifuged at 4000 r.p.m. for 15 minutes. The supernatant fluids were removed and 60 c.c. of each filtered through a Seitz EK disc. Extracts of the deposited organisms themselves were made by the method already described. Two c.c. of both filtrates and both extracts were heated at 56° C for 60 minutes and mice injected intravenously with various doses of each. The hæmolytic titre for horse red cells of all the preparations was also determined. The results are given in table I.

This experiment shows that a heat-labile toxin cannot be obtained by filtration of a plain broth culture, but can be obtained from a serum broth culture, as was shown by Channon and McLeod, or by the agitation of the organisms derived from either a plain or serum broth culture in previously inactivated horse serum. It is, however, of very considerable interest and importance that the toxicity of the various preparations varied considerably. The filtrate of the plain broth culture contained no toxin at all, that of the serum broth culture was toxic but weak. Both the extracts made by agitation of the organisms themselves in horse serum were very much more toxic, but that made from organisms grown in serum broth was weaker than that made from organisms grown in plain broth. The toxicity and hæmolytic power of all the preparations was destroyed by heat at 56° C for 60 minutes.

It would therefore seem that there is attached to the bodies of hæmolytic streptococci a heat-labile toxic substance which is soluble in inactivated horse serum. If serum be present in the

New Books

Books Received.—The following books have been received by the Editor; they will be reviewed critically as space and facilities permit. Omission of more extended review, however, is not to be taken as criticism of the merit of the book.

Ankylosing Spondylitis: Clinical Considerations, Roentgenology, Pathologic Anatomy and Treatment. By J. Forestier, F. Jacqueline and J. Rotes-Querol. Translated by A. U. Desjardins. Springfield, Ill.: Charles C Thomas, Publisher, 1956. Pp. 374, with 145 illustrations.

Tumors of the Skin. By Herbert Conway. Springfield, Ill. Charles C Thomas, Publisher. 1956. Pp. 267, with 178 illustrations, 3 in color.

Handbook of Physical Therapy. By Robert Shetack. New York: Springer Publishing Company, Inc., 1956. Pp. 212.

Atlas of Tumors of the Nervous System. By H. M. Zimmerman, Martin G. Netsky and Leo M. Davidoff. Philadelphia: Lea & Febiger, 1956. Pp. 191, with 277 illustrations (233 in color).

Etiologic Factors in Renal Lithiasis. By Arthur J. Butt. Springfield, Ill.: Charles C Thomas, Publisher, 1956. Pp. 401, with 153 illustrations.

New Illustrated Practice of Surgery: Fascicule IX. Edited by Jean Quenu. Paris: G. Doin et Cie. 1956. Pp. 264, with 227 illustrations. *Reviewed in this issue.*

How to Enjoy Good Health. Edited by Cyril Solomon and Brooks Roberts. New York: Random House, 1956. Pp. 240.

Diagnostic Procedures for Virus and Rickettsial Diseases. American Public Health Association. New York: Publication Office, American Public Health Association, 1956. 2d ed., Pp. 578.

Head Injuries and Their Management. By Francis Asbury Echlin. Philadelphia: The J. B. Lippincott Company, 1956. Pp. 127, with 10 illustrations.

Pye's Surgical Handicraft. Edited by Hamilton Bailey. Bristol: John Wright & Sons, Ltd., 1956. 17th ed. Pp. 800, with 860 illustrations.

The Merck Manual of Diagnosis and Therapy. Rahway, N. J.: Merck & Co., Inc., Publications Department, 1956. 9th ed. Pp. 1,888. *Reviewed in this issue.*

Surgery in General Practice. By Victor Richards. St. Louis: The C. V. Mosby Company, 1956. Pp. 947, with 476 illustrations. *Reviewed in this issue.*

Fluid Balance Handbook for Practitioners. By William D. Shively Jr. and Michael J. Sweeney. Springfield, Ill.: Charles C Thomas, Publisher, 1956. Pp. 326. *Reviewed in this issue.*

The Biliary Tract. By Julian A. Sterling. Baltimore: Williams and Wilkins, 1956. Pp. 424, with 94 illustrations. *Reviewed in this issue.*

Bronchus und Tuberkulose: Bronchoskopische und Bronchographische Untersuchungen der Bronchien bei der Tuberkulose (Fortschr. a. d. Geb. d. Röntgenstrahlen, Ergänzungsband 73). By A. Huzly and F. Böhm. Stuttgart: Georg Thieme Verlag, 1955. Distributed in the United States and Canada by the Intercontinental Medical Book Corporation. New York 16, New York. Pp. 138, with 258 illustrations. *Reviewed in this issue.*

culture fluid, some is probably dissolved during the period of growth, giving a filtrate which possesses slight toxicity, while the organisms themselves evidently part with sufficient of their toxin to render extracts made by their subsequent extraction in serum less toxic than extracts made from organisms grown in plain broth and not subjected to the presence of serum during their period of growth. The hæmolytic tests showed that the hæmolytic titre was roughly parallel to the toxicity of the preparations.

The symptoms from which the animals suffered and the post-mortem appearances seen after the injection of this toxin must now be referred to.

The effects produced by the injection of toxic extracts

Toxicity for mice

Intravenous injection Very striking results are obtained provided the extract is potent and a dose of 0.3–0.5 c.c. injected. The animal almost immediately becomes acutely ill. Its eyes stare and it becomes hyperæsthetic, running round the cage if touched. It then shows signs of collapse, takes deep sighing respirations and lies on its side kicking its legs in the air. Death occurs in from 2 to 10 minutes from the time of injection. If smaller doses be injected or a weaker extract used, the animal presents a somewhat different appearance. It may appear normal for a few minutes but then becomes quiet, sits in a corner with arched back and staring coat. It closes its eyes and breathes rapidly. It may remain in this condition for 12 to 24 hours, becoming progressively weaker so that when moved it is almost unable to crawl back to its corner. Respiration finally becomes slower, it collapses and dies. Death is most usual during the first 24 hours following injection and if the animal survives for three days it almost invariably recovers completely. After the end of the first hour large quantities of blood stained urine are voided. The effects produced by different doses of a strong extract and the post-mortem appearances of the animals are given in table II.

Intraperitoneal injection As a rule, extracts which are able to kill mice in doses of 0.1 c.c. in less than 24 hours when injected intravenously are unable to kill mice on intraperitoneal injection of 0.5 or even 1 c.c. amounts. Sometimes the animal appears ill and to have abdominal pain, because it rubs its belly along the floor of the cage. It may also pass blood-stained urine, but it is very unusual for the animal to die. If this does occur, the post-mortem appearances are similar to those seen after intravenous injection.

Subcutaneous injection In doses of 0.5 c.c. I have never observed any ill effects.

Center of Baylor University. These impulses have made him, no medical man, a force in American medicine, and medical readers may find it worth their time to trace his development as here set forth, albeit in journalistic style, by two veteran newsmen.

Roy Cullen's was a hard road of experience as cotton broker, real estate man, and "wild-catter" oil producer. It led to triumph as he succeeded in bringing in wells in areas abandoned after repeated failures by experts of the big companies—a success that hinged on his intimate knowledge of terrain, including the configuration of water-courses (which he dubbed "creekology"). His technical achievement was recognized when the Ph.D. was awarded him for a method of drilling through the stratum of "heaving shale." Not without importance, too, are the many pages devoted to his political activities as a Texas Republican, whereby he again exerted a national influence.

Alike in politics, business, and benefactions, Mr. Cullen has championed the conservation of traditional liberties and independence in enterprise. His life thus presents the classic picture of that philosophy as applied to the system of medical enterprise in America. As such it offers a thought-provoking object lesson to other leaders; for that system will endure only if they sense and face up to their responsibilities, creatively, with humanity and love for all colors and creeds.

Admittedly, this is an "appreciative" biography, in the saga tradition. Yet, the human character does come through, in homely turns of speech, and again in moments of high drama. The reader will not soon forget the picture of Roy Cullen weeping as he receives the thanks of crippled patients he has helped, and his words: "My cup runneth over."

M. T.

Bronchus und Tuberkulose: Bronchoskopische und Bronchographische Untersuchungen der Bronchien bei der Tuberkulose (Fortschr. a. d. Geb. d. Röntgenstrahlen, Ergänzungsband 73). By A. Huzly and F. Böhm. Struttgart: Georg Thieme Verlag, 1955. Distributed in the United States and Canada by

the Intercontinental Medical Book Corporation, New York 16, New York. Pp. 138, with 258 illustrations.

The authors emphasize in this preface the fact that they chose the title "Bronchus and Tuberculosis" and not "Tuberculosis of the Bronchus" to indicate that not all alterations of the bronchial tract in the tuberculous patient are a result of bronchial tuberculosis.

The first four chapters deal with pathologic changes involving the bronchus occurring in pulmonary tuberculosis, in tuberculosis of the endothoracic lymph nodes, in tuberculous pleuritis, and as a result of active management of pulmonary tuberculosis by pneumothorax, phrenicus exeresis and segmental resection.

The fifth and sixth chapters are devoted to a comprehensive study and discussion of tuberculosis of the bronchus. The final (seventh) chapter describes the sequelae of healing or healed tuberculosis affecting the bronchus, such as stenosis, bronchiectasis and deformities.

The study is based on 3,213 bronchoscopic and 2,373 bronchographic examinations of tuberculous patients, and the authors claim that tuberculous alterations of the bronchus are observed in 10 to 13 per cent of the cases. The subject is discussed mainly by the presentation of thoroughly studied hospital cases, which are illustrated by routine roentgenograms of the chest, tomograms, bronchograms, and diagrams or colored drawings of the bronchoscopic observations.

The book represents much more than a report on an elaborate scientific study. The observations reported are of great practical significance in the prognosis of tuberculous lesions of the bronchus and for the evaluation of therapeutic procedures in pulmonary tuberculosis. It is encouraging to realize that modern chemotherapy is able to cure bronchial tuberculosis in a great number of cases which, until not so long ago, belonged in the "hopeless" category. The observations of the authors further indicate that, among the methods of collapse therapy, thoracoplasty is often responsible for deformities and stenoses of the bronchus with subsequent devastating bronchiectases, while such complica-

Intradermal injection In doses of 0.1 c.c. no effects have been observed

Post-mortem appearances Very characteristic changes are usually seen. They differ according to the period of time the animal has survived.

Survival for less than one hour There is usually considerable enlargement of the liver and spleen, which are very deep red in colour and engorged with blood. The kidneys appear normal. The bladder contains clear urine. The blood is strongly hæmolyzed and on microscopic examination the majority of the red cells are seen to have parted with their hæmoglobin, only a few surviving undamaged. The white cells do not seem to be altered in any way.

Survival for more than one hour but less than eight hours There is frequently an intense pink staining of the subcutaneous tissues, pectoral muscles and intestines. This appears to be due to hæmolyzed blood. The bladder contains blood-stained urine. The liver, spleen and kidneys are deep red, engorged and swollen. The blood still contains many ghosts of red cells.

Survival for more than eight hours There is almost always marked jaundice of the subcutaneous tissues and subperitoneal fat. The intestines in the region of the liver contain considerable quantities of heavily bile-stained fluid. The bladder contains much blood-stained urine. The liver is usually pale, shrunken, sometimes loaded with bile and occasionally studded with hæmorrhages. Its pattern is usually prominent. The spleen is usually small and pale. The kidneys are almost invariably swollen, engorged with blood, deep red in colour and usually flecked with hæmorrhages. The blood is markedly anæmic, the plasma still containing some free hæmoglobin, but on microscopic examination only a few ghosts of red cells can be seen.

In animals which survive for a week and are then killed, being apparently in good health after a severe illness during the first 48 hours, the general appearance of the organs *post mortem* is much the same as that seen in normal animals. The liver tends however to be small and pale in colour, with a marked pattern. The kidneys too are very pale, yellowish in colour and with no glomeruli visible, but with pin points of hæmorrhage, evidently the remains of the larger hæmorrhages seen during the acute stage. The whole of the tissues are obviously anæmic. Similar changes are seen in mice which die after the injection of filtrates of serum broth cultures.

On the whole the most characteristic changes seen in mice dying in the early stages are the marked hæmolysis of the blood and pink staining of the subcutaneous tissues and intestines, and in the later stages the jaundice, the bile staining of the intestines, the pale shrunken liver, the dark engorged kidneys flecked with hæmorrhages and the blood-stained urine in the bladder.

pochlorhydria. He cites the work of Bruce as having demonstrated conclusively that the capacity for acid secretion, even to an abnormally high level, can be fully recovered by the remaining segment of stomach. If confirmed, this would constitute a most serious indictment of partial gastrectomy.

At present the problem of preventing post-gastrectomy complications is largely unsolved.

Concerning gastrojejunostomy and vagotomy, Farquharson expresses the opinion that this method of treatment is still in the experimental stage. In his experience this combination has proved quite satisfactory as regards the immediate or early results, but he is convinced that many of the successes may have resulted from the gastrojejunostomy alone and that the vagal resection carries some disadvantages, including complications that may develop in later years from the denervation of such a large part of the alimentary tract.

The third portion of this provocative and timely article deals with gastrojejunostomy alone and what can be expected from this operation for the duodenal ulcer patient today, in contrast with the same operation employed for the same disease during the first two decades of this century. Since about 1925, gastrojejunostomy has fallen into disrepute because of its alleged liability to subsequent stomal ulceration.

The incidence of stomal ulceration following gastrojejunostomy has been reported at widely divergent figures from various sources. Farquharson is of the opinion that the incidence is probably much closer to the 3.5 per cent noted in a large series of collected reports than to the figures ranging as high as 50 per cent reported from other, much smaller, statistical material.

Even if the higher incidence of stomal ulcer were factual, the complication today is no longer the serious matter that it was twenty years ago. Tanner (1954) encountered only 1 death in 107 cases, which represents a mortality rate actually lower than that which he records for partial gastrectomy in uncomplicated cases of gastric and duodenal ulcer. In short, stomal ulcer after a simple gastrojejunostomy seems at present to be readily amenable to treatment by partial gastrectomy. The de-

velopment of further stomal ulceration is comparatively rare, possibly because the jejunum has developed some degree of immunity to the gastric juice.

By contrast, the patient in whom a stomal ulcer develops after partial gastrectomy is in a very different position. Although this complication may be much less common than it is after gastrojejunostomy, it is incomparably more serious, for there is little to offer the patient except the doubtful benefits of a still higher gastrectomy or a vagal resection.

In summary, this article gives voice to the author's serious doubts and misgivings that such an irrevocable and seemingly mutilating operation as partial gastrectomy should be accepted as the standard treatment for duodenal ulcer today. Farquharson is not at this point advocating unreservedly a return to simple gastrojejunostomy as the surgical treatment of choice for duodenal ulcer. He does, however, question whether it might not be more reasonable to accept a high risk of stomal ulceration in return for the privilege of retaining the stomach.

This reviewer recommends strongly that the original article be read by every gastric surgeon.

THOMAS WILENSKY, M.D.

Some Observations on the Incidence of Thyroid Cancer in the United States. Mustacchi, P., and Cutler S. J., *New England J. Med.* 225:889, 1956.

The authors attempt to correlate the incidence of carcinoma of the thyroid according to age, sex and geographic region. The study includes ten metropolitan areas with a population of 14,000,000 inhabitants. It was observed that carcinoma of the thyroid occurs more frequently than is generally supposed. The incidence is higher in women than in men and equal in the white race and nonwhite races. The incidence of nonpapillary carcinoma increases with age, whereas papillary carcinoma is not affected by age. This study revealed a higher incidence in the west than in other areas.

ERNEST G. DEBAKEY, M.D.

and in the capsular spaces, associated with an acute tubular degeneration. The blood vessels however contain intact red blood cells and the amount of hæmoglobin in the tubules is on the whole much less than in mice injected with extracts. Of the remaining organs only the *liver* shows very much change in that there is marked swelling and vacuolation of the cells and the presence of much eosinophilic material in the sinusoids. This is particularly marked immediately beneath the capsule. Focal necroses are occasionally seen. No abnormalities in the *spleen* or the *lungs* have been detected.

Toxicity for guinea-pigs

An extract which killed mice in doses of 0.1 c.c. with a hæmolytic titre of 1:2048 was employed. One c.c. injected *intracardially* made the animal very ill for 48 hours but without any very definite symptoms other than the passage of blood-stained urine. Five c.c. injected *intraperitoneally* also made the animal very ill. For 48 hours it was very listless and weak but then recovered. No blood-stained urine was passed. Five c.c. injected *subcutaneously* also made the animal very ill for 48 hours, but in addition there developed a large swelling 7.5 cm. long \times 3.4 cm. wide. It was very tense and painful and the skin over it was injected. It was at its worst 24 hours after the injection and gradually faded away until in 3 days it had disappeared altogether. After the first 24 hours the swelling had a yellowish tinge. No suppuration or necrosis occurred. One c.c. injected into another animal caused the development of a very similar but smaller swelling, 4 \times 2 cm. Neither animal passed blood-stained urine but both were obviously sick for 48 hours. *Intradermally* in doses of 0.2 c.c. no untoward effects were observed.

Toxicity for rabbits

An extract able to kill mice in doses of 0.1 c.c. and with a hæmolytic titre of 1:1024 was employed. Ten c.c. injected *intravenously* caused the death of the animal within two minutes. *Post mortem* the same changes were seen as in mice dying quickly after injection, that is to say engorgement of the liver and spleen, with the blood strongly hæmolytised. Four c.c. of the same extract injected into another animal did not appear to affect it at first. For two hours it showed no symptoms and took its food readily but was found dead next morning, that is within 18 hours of the injection. *Post mortem* there was jaundice of the subcutaneous tissues and peritoneal fat, much bile-stained fluid in the intestines, and blood-stained fluid in the bladder. The liver appeared to be overloaded with bile, somewhat paler than usual and with a prominent pattern. The spleen was small and dark. The kidneys

of the status of the pancreas, is additionally important. With any of these congenital abnormalities, surgical dissection must be advanced with extreme caution, since any type of arterial abnormality may be encountered.

Abnormal positions of the gallbladder, including 1 case in which the organ was in the abdominal wall and 1 in which it occupied the falciform ligament, are on record. Two cases of left-sided gallbladder, reported by Etter in 1953 are also included.

A transverse position of the gallbladder, in which the viscus was almost entirely surrounded by hepatic substance, was encountered twice by Gross in 1936, but no cases have been reported since that time.

One case of retroperitoneal retroduodenal gallbladder is included.

The intrahepatic gallbladder is either partially or totally embedded. Liver needling has been recommended in cases of apparent absence of the gallbladder. Removal of a totally embedded gallbladder presents extremely difficult problems of hemostasis, and the method of procedure must depend upon the extent to which the organ is included within the liver substance.

Torsion of the gallbladder occurs only when the organ is entirely surrounded by peritoneum and either lies free in the abdominal cavity or is suspended from the undersurface of the liver by a length of mesentery. Torsion of the gallbladder has been reported as occurring in a 5-year-old child and in a patient 93 years old. In the present series of 24 cases since 1936, only 1 death was reported—that of a 79-year-old white man. The possibility of torsion and axial rotation in elderly persons should be kept in mind, as delaying operation is likely to result in death.

Gastrointestinal mucosa and pancreatic tissue have both been observed within the gallbladder wall. Aberrant pancreatic tissue has also been reported as existing in the wall of the cystic duct.

THOMAS WILENSKY, M.D.

Outcome of Surgery for Ulcerative Colitis.
Brooke, B. N., *Lancet* 2:543, 1956.

The question has arisen as to what is the

expectation of life of patients who have undergone total colectomy for ulcerative colitis. The author answers this question by reviewing the cases of 131 patients with ulcerative colitis who come under his care. For 5 patients, only emergency or diagnostic laparotomy was undertaken; 126 underwent elective operations (117, excision and permanent ileostomy; 9, resection and anastomosis) with 15 operative and late deaths, a mortality rate of 12 per cent.

The disease was twice as common in the female as in the male and was most common between the ages of 20 and 40. The youngest patient was operated on at the age of 6 years.

Indications for operation were continued deterioration of the patient despite conservative measures; a status that made it otherwise unlikely that the patient could return to normal life; complications, both anorectal and remote; acute emergencies of hemorrhage and perforation, and carcinoma. The operation was most commonly done either early in the disease or after ten years.

The curative surgical treatment was first undertaken in three stages—ileostomy, colectomy and excision of the rectum. It is now done in one stage (primary panproctocolectomy) or, if the patient's condition will not permit dissection in the pelvis, in two stages (primary colectomy and rectal excision, or ileostomy and panproctocolectomy). Resection and anastomosis, with preservation of anal function, were performed on 9 patients.

One of the local complications of ulcerative colitis has been colioileitis, which results secondarily from reflux through the ileocecal valve, which is so damaged by the disease as to become incompetent. One to two feet of the ileum may become involved, but the condition is never sufficiently serious to impair the function of the small bowel. Fissures, fistulas and ischiorectal abscesses were the most common anorectal lesions. Carcinoma was observed in only 4 of the 131 cases, and the 4 patients had ulcerative colitis for ten years or more. Perforation was present in 6 cases of the series. It could easily have been missed, since the classic signs associated with perforation of a hollow viscus into the peritoneal cavity were absent. Hemorrhage was the predominant feature in 4 of the patients. Fulminating disease, such as

much less hæmolytic but quite clearly toxic. Similar evidence is brought forward in table IX. All these tests were carried out with horse red cells but a similar lack of correlation was noted by Weld and by Schluter and Schmidt employing rabbit cells. It is possible that correlation might have been obtained with mouse cells but they were not tested.

TABLE III

To show the lack of correlation between the toxicity of the extracts and their hæmolytic titre

Dose	Batch of medium							
	2.	5	10	11	12	13	14	15
0.5 c.c.	22 hours	>4<20 hours	10 mins	72 hours	10 mins	Recovered	Recovered	10 mins
0.4 "	45 "					>3<19 hours	Recovered	3 "
0.3 "	45 "	28 hours	6 mins	Recovered	>4<20 hours	Recovered	Recovered	3½ "
0.2 "	20 "					Recovered	Recovered	9 "
0.1 "	Recovered	Recovered	48 hours	Recovered	>56<70 hours	Recovered	Recovered	8 hours
Hæmolytic titre	1 1024	1 64	1 1024	1 256	1 1024	1 512	1 1024	1 512

The times given refer to the period elapsing between the injection of the extract and the death of the animal. All tests were carried out with the same dried specimen of strain Gay. Several batches of inactivated serum were employed, samples of each of which injected into control mice in quantities of 0.5 c.c. caused no symptoms.

Leucocidin. Weld states that extracts prepared by her method contain a leucocidin which can be demonstrated by the Neisser-Wechsberg method and that degeneration can be detected in the cells when stained after incubation with the extract. Channon and McLeod mention that their filtrates had a slight but indefinite action on leucocytes, but if the filtrates were concentrated *in vacuo* and then added to human cells there was complete disintegration of the cells after incubation for 3 hours. I have been unable to show that even potent extracts made by Weld's method have any effect on human leucocytes. In a concentration of 1/10 in human blood, after incubation for 30 minutes there was no diminution in the leucocyte count and the cells in stained films appeared normal, although all the red cells were completely hæmolyzed. The same result was obtained after incubation for 2 hours and in mixtures of equal parts of cells and saline and one-tenth part of extract. Even undiluted extract mixed in equal volumes with washed human corpuscles and incubated for 2 hours was without effect on either the leucocyte count or the appearance of the cells. In phagocytic experiments with defibrinated blood the polymorphonuclear leuco-

tion. The conclusions drawn are that, although a cause-and-effect relation between spinal anesthesia and the exacerbation of disease has not been shown, spinal anesthesia should not be given to a patient with disease of the central nervous system or the spinal column. This applies to congenital, healed, inactive or active disease. It embraces trauma, bacterial and

viral infections, degenerative diseases, neoplasms and systemic diseases with neurologic accompaniments. Exceptions to the rule may be made only when a type of anesthesia other than spinal is potentially more hazardous in the hands of the person administering it.

WARREN A. YEMM, M.D.

**The Tenth International Congress
of the
INTERNATIONAL COLLEGE OF SURGEONS**

by invitation of His Excellency Don Adolfo Ruiz Cortines,
President of the Republic of Mexico

will be held at University City, Mexico, D. F., on

February 24 to 28, inclusive, 1957

For further information, please address Secretariat, International
College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois.

Preservation of the toxic and hæmolytic properties at different temperatures

As already shown, the extracts are completely inactivated by a temperature of 56° C for 60 minutes. The effect of preservation at other temperatures for varying periods of time has also been studied and the results are given in tables V and VI. In these experiments no attempt was made to exclude oxygen from the preparations. Indeed they were in all probability fully oxygenated, as they were placed in quantities of 2 c c in $6 \times \frac{5}{8}$ in tubes, but the tubes were sealed with paraffin-impregnated plugs to prevent evaporation.

TABLE V

Effect of heating the extracts

Dose	Unheated extract	Extract heated at 56° C for	
		30 mins	60 mins
0.5 c c	Death in 2 mins	Sick for 48 hours, recovered	No symptoms
0.3 "	Death in 3 mins	No symptoms	" "
0.1 "	Death in >2<11 hours	" "	" "
Hæmolytic titre	1 500	1 32	1 4

All surviving mice killed on the ninth day and post mortem appearances found to be normal except in the mouse which received 0.5 c c of extract heated at 56° C for 30 minutes, where there was a pale shrunken liver and yellow kidneys spotted with resolving hæmorrhages.

It will be seen that 60 minutes at 56° C led to complete inactivation, as already shown in table I. After 30 minutes at this temperature there was still some activity, although this was very considerably impaired. Sixteen hours at 37° C and at 40° C led to complete inactivation. At room temperature (26° C) there was considerable diminution after 16 hours, complete inactivation after 44 hours. At 7° C there was slight diminution in 16 hours and even after 48 hours the extract was still fairly potent. At -20° C (the temperature of a freezing mixture) there was practically no alteration after 16 hours, but at 44 hours there was slight but obvious diminution in potency.

The effect of acidity and alkalinity on the toxic and hæmolytic power of the extracts

Samples of an extract which immediately after filtration had a pH of 7.5 were brought to other pH levels by the addition of *N* HCl and NaOH. All preparations were kept at 7° C, fully exposed



The Journal of the International College of Surgeons

PUBLICATIONS

The Journal. The Journal of the International College of Surgeons is one of the important surgical journals in the modern surgical world. The names of many of its contributors are world-famous. It is published monthly and offers from fifteen to twenty original scientific articles in each issue, all of which are *summarized in six languages*. In addition, it carries reviews of important new books and abstracts of the current surgical literature.

Any surgeon, whether or not a member of the College, is welcome to submit his work to the Journal. Indeed, although many of our regular contributors are Diplomates of the College, scarcely an issue appears without articles written by non-members as well.

The Bulletin. Formerly the Journal also carried news of the College to all its members and friends. Lately, however, the need of Journal space for the immense number of valuable scientific papers submitted has led to the establishment of a supplementary monthly Bulletin for that purpose.

A sample copy may be had on request. The subscription rate is \$14.50 annually for 12 issues, published monthly.

Joseph J. Boris, Circulation Manager
10 Columbus Circle, New York 19, N. Y.

TABLE VII
Effect of preservation of the extracts at different degrees of acidity and alkalinity

Dose	pH of extract					
	0.4	7.0	7.0	8.0	8.0	9.0
0 hours						
0.5 c.c.				Death in 5 mins		
0.3 "				Death in 1 hour		
0.1 "				Death in >7<18 hours		
Hæmolytic titre				1 1024		
16 hours						
0.5 c.c.	Death in 6 hours	Death in 2 hours	Death in 3½ hours	Death in 1½ hours	Death in 15 mins	Death in 12 mins
Hæmolytic titre	1 512	1 512	1 512	1 512	1 512	1 512
36 hours						
0.5 c.c.	Death in 2½ hours	Death in 1½ hours	Death in 8 hours	Death in >9<21 hours	Death in >9<21 hours	Death in 21 hours
Hæmolytic titre	1 64	1 64	1 64	1 64	1 128	1 128

Controls Three mice injected with 0.5 c.c. of a sample of the inactivated serum employed showed no symptoms

TENTH
INTERNATIONAL
CONGRESS

International College of Surgeons
University City
Mexico, D. F., Mexico
Feb. 24-28, 1957



Prof. Dr. Manuel A. Manzanilla, F.I.C.S., Professor of Clinical Surgery of the Faculty of Medicine of the National University of Mexico, Member of the Mexican Academy of Surgery, Member of the National Academy of Sciences of Mexico and Chairman of the Arrangements Committee of the Tenth International Congress.

The Tenth International Congress of the International College of Surgeons will take place in the School of Medicine, National University of Mexico, University City, Mexico, D. F., on Feb. 24-28, 1957, at the invitation of the Mexican Government and under the honorary presidency of His Excellency Don Adolfo Ruiz Cortines, President of the Republic of Mexico.

The Arrangements Committee of the Congress extends a cordial invitation to national and foreign colleagues to attend this important international surgical assembly. An outstanding scientific program that has aroused extraordinary interest not only in Mexico but in every part of the

civilized world is to be presented. Approximately two thousand surgeons have already expressed their intention of attending the meetings. The final program of the Congress is being prepared, under the symbolism of Xipetotec, God of Surgeons according to Aztec mythology, as he is represented in a Florentine manuscript. Meanwhile, preliminary information about the forthcoming program is being presented for the convenience of those who intend to participate.

Honor Roll.—On the Honor Roll of the Congress are the following persons: His Excellency Don Adolfo Ruiz Cortines, Honorary President of the Congress and Con-

TABLE VIII

Effect of varying the time of extraction

Dose	Extracts made after agitation of organisms in serum for		
	60 minutes	30 minutes	15 minutes
0.5 c.c.	Death in 5 hours	Death in >6<19 hours	Death in >6<19 hours
0.4 "	Sick for 64 hours, recovered *	Death in >24<40 hours	Sick for 40 hours, recovered †
0.3 "	Death in 23 hours	Sick for 24 hours, recovered ‡	Death in >6<19 hours
Hæmolytic titre	1 1024	1 512	1 256

* Killed eighth day slight subcutaneous jaundice, liver small and pale with very marked pattern kidneys pale with resolving hæmorrhages, marked anemia, blood not hæmolyzed.

† Killed eighth day no jaundice, liver normal kidneys pale with resolving hæmorrhages, no marked anemia

‡ Killed eighth day no jaundice, liver pale and small kidneys of normal colour but with resolving hæmorrhages

the same but that the toxicity of the fifth and sixth extractions was less than that of the first and second and third and fourth, which were carried out the previous day

TABLE IX

To show toxicity and hæmolytic titre of successive extractions of one lot of organisms

Dose	Combined first and second extractions	Combined third and fourth extractions	Combined fifth and sixth extractions
0.5 c.c.	Death in 2 mins	Death in 2 mins	Death in >4<20 hours
0.3 "	Death in 3½ mins	Death in 3 mins	Death in >54<70 hours
0.1 "	Death in 8 hours	Death in >2<11 hours	No symptoms, recovered
Hæmolytic titre	1 512	1 512	1 512

DISCUSSION

It would appear from these experiments that hæmolytic streptococci form an intensely toxic substance which is soluble in serum, so that it may be found in the filtrates of young serum broth cultures or when the organisms previously grown in broth are agitated in serum. This toxin is extremely labile, being easily inactivated by even moderate degrees of heat.

The preparations also contain hæmolysin, and it is a matter for



Gold mask of the god Xipetotec, found in tomb No. 7 of Monte Albán, Oaxaca.

—Photo by courtesy of Prof. Manzanilla

Specialized Sections. — Sessions of the specialized surgical sections will meet in different classrooms of the School of Medicine, the specific locations to be announced.

Congress Office.—The office of the Tenth International Congress will be in a section of the administrative offices of the School of Medicine.

Languages. — The official languages of the Congress will be Spanish, English, French, Italian, Portuguese and German. Simultaneous translation in most instances will be presented in Spanish and English, because of the difficulty of arranging for accurate simultaneous oral interpretation in all of the languages of the International College.

Official Functions. — Five official functions have been arranged during the Congress period. On Sunday, February 24, at 9 a.m., an Honor Guard will place a wreath before the perpetual light, lit in memory of the heroes of Mexican independence at the Column of Independence on La Reforma Avenue; on Sunday also, between 1 and 1:30 p.m., Congress participants will be officially welcomed by the Chief of the

Federal District Department in the Palace of the Federal District Department on Constitution Square; on Sunday evening at 9, the solemn opening of the Tenth International Congress of the International College of Surgeons will take place in the theater of the Palace of Fine Arts, under the Presidency of His Excellency Don Adolfo Ruiz Cortines, President of the Republic of Mexico; on Tuesday, February 26, at 9 p.m., an academic session dedicated to the Tenth International Congress by the Mexican Academy of Surgery will take place in the auditorium of the old building of the School of Medicine on Santo Domingo Square; on Thursday, February 28, from 8 to 9 p.m., the solemn ceremony marking the close of the Tenth International Congress will take place in the auditorium of the School of Medicine in University City, under the presidency of the Secretary of Public Health and Welfare, Dr. Ignacio Morones Prieto.

Social Functions.—On Monday, February 25, at 9 p.m., a pageant will be shown as a courtesy to the Arrangements Committee of the Congress from the Secretary of Public Education. On Wednesday, February 27, at 9:30 p.m., the banquet of the Tenth International Congress will begin. A reception, the schedule of which is to be announced, will be arranged by the Ladies' Committee for their guests.



Attention to parturition by the Aztec midwife, also from the mural of Chávez Morado in Ciba of Mexico.

—Photo by courtesy of Prof. Manzanilla

REFERENCES

- | | | |
|---|---------|--|
| BRAUN, H | 1912 | <i>Cbl Bakt</i> , Abt I Orig, lxi 383 |
| CÉSARI, E, COTONI, L, AND
LAVALLÉ, J | 1927 | <i>Ann Inst Pasteur</i> , xli 919 |
| CHANNON, H A, AND MCLEOD,
J W | 1929 | this <i>Journal</i> , xxxii 283 |
| CLARK, A H, AND FELTON, L D | 1918 | <i>J Amer Med Assoc</i> , lxxi 1048 |
| HAVENS, L C, AND TAYLOR, M L | 1921 | <i>Amer J Hyg</i> , i 311 |
| LEPPER, E, AND MARTIN, C J | 1929 | <i>Brit J Exp Path</i> , x 327 |
| MCLEOD, J W, AND MCNEE,
J W | 1912 13 | this <i>Journal</i> , xvii 524 |
| NARAYAMA, Y | 1919 | <i>J Inf Dis</i> , xxv 509 |
| SCHLÜTER, W, AND SCHMIDT, H | 1936 | <i>Z Immunitätsforsch</i> , lxxxvii 17 |
| SWIFT, H F, AND HODGE, B E | 1932 33 | <i>Proc Soc Exp Biol and Med</i> ,
xxx 1022 |
| TODD, E W | 1932 | <i>J Exp Med</i> , lv 267 |
| WELD, J T | 1934 | <i>Ibid</i> , lxx 83 |
| " | 1935 | <i>Ibid</i> , lxi 473 |

TRIBUTE TO THE PRESIDENT OF THE
INTERNATIONAL COLLEGE OF SURGEONS,
PROF. DR. CARLOS GAMA



Dr. Gama, acknowledging the tribute paid him, clad in the academic robe bestowed upon him by Dr. Matheus Santamaria.

The Board of Directors of the Brazilian Section of the International College of Surgeons, under the chairmanship of Prof. Mauricio de Medeiros, Brazil's Minister of Health, organized a grand ceremonial meeting at the Municipal Library of São Paulo to honor Prof. Dr. Carlos Gama upon his election to the presidency of the International College. The festive occasion was arranged to mark the first time in history that a Brazilian has been accorded so high an office by an international medical organization. It was a solemn event. To the strains of the Brazilian National Anthem, the flags of all nations represented in the International College

of Surgeons were massed before the large and distinguished audience.

An academic robe of honor was presented to Prof. Gama by Dr. Matheus Santamaria, who presided. Prof. de Medeiros delivered an address entitled, "Motivation and Intelligence," after which the representatives of many Brazilian medical societies and the leaders of the regional divisions of the Brazilian Section of the College extended their greetings.

Prof. Gama, in acknowledging the tribute, expressed his appreciation to the men officiating over the meeting; to officers and members of the Brazilian Section; to Dr. Fernando Luz Filho, Regional Secretary of the International College for South America; to all national, state, municipal, clerical, civil and military authorities present; to the foreign representatives; to the officers and representatives of other medical and surgical societies; to representatives of the Brazilian Red Cross; to the nurses and the medical students attending; to all who shared in the planning of the meeting; to the representatives of the Brazilian press, and to all who had thronged to express their loyalty to a fellow Brazilian.

He remarked that on Sept. 30, 1949 the Brazilian Section had been installed as a national division of the International College of Surgeons in the very same auditorium, under the chairmanship of Prof. Pedro Calmon, Rector of the University of Brazil. Two years later, he recounted, the First National Congress of the Brazilian Section had convened in the same hall, with North American, Canadian and Argentinian surgeons and officers of the International College present. Prof. Lucas Nogueira Garcez, then the Governor of São Paulo, had presided over that Congress and had also officially in-

present paper reports investigations bearing upon these unsettled questions

THE SKIN REACTIONS OF PUERPERAL FEVER CASES INFECTED BY HÆMOLYTIC STREPTOCOCCI

The 100 patients tested had received neither antitoxic nor "anti-streptococcus" serum. They were tested as early as possible after the infection by hæmolytic streptococcus was recognised, in order to exclude the possibility of their having changed from Dick-positive to Dick-negative as a result of the infection. All were notifiable as "puerperal fever" except one whose temperature did not exceed 100° F at any time.

Procedure

The toxin used for the Dick test was supplied by Messrs Burroughs Wellcome & Co., 0.2 c.c. was injected intradermally on the ventral surface of the forearm, a similar injection of heated toxin being made into the other arm as a control. A positive reaction consisted in the appearance within twenty-four hours of an erythematous patch of at least 1 × 1 cm (= +). Of reactions of greater intensity, those measuring approximately 2 × 2 cm were designated as 2+, those 3 × 3 cm as 3+, etc. All positive reactors were re-tested in the second, third or later weeks of the puerperium.

The results of the initial skin tests

The reactions of the 100 puerperal fever cases are shown in table I, together with those previously recorded (the toxin having

TABLE I

Results of the Dick test performed on 100 early cases of puerperal infection by hæmolytic streptococci and on normal adult women

	Number tested	Positive reactions
Puerperal fever cases infected by hæmolytic streptococci		
Tested 0-4 days after onset of fever	67	13 = 19.4 per cent
Tested 5-8 days after onset of fever	27	5 = 18.5 per cent
Tested 8-13 days after onset of fever	6	1 = 16.6 per cent
Normal adult women		
During pregnancy or at term— (Burt White Colebrook, Morgan, Jervis and Harre 1930)	1000	230 = 23 per cent
Ditto (Stent, 1930)	500	140 = 28 per cent

been obtained from the same source) in the investigation of 1500 women at or near term, most of whom may be presumed to have

- Emanuel Marques Porto
- Benjamin Salles
- Pedro Falcão
- Ribeirã Preto
- Matheus Santamaria
- Eduardo Wanderley
- Emilio Navajas Filho
- Jorge Machado
- João Dias Ayres

"With so loyal and hard working a team, my task is bound to be greatly eased."

Prof. Gama concluded his address with the following comments:

"This is an opportune time to comment on the enormous work accomplished by Dr. Max Thorek, our Founder and the permanent Secretary General of the International College since the inception of our organization. After years of unremitting, exhausting work on behalf of the College, Dr. Thorek was stricken with pneumonia during the twentieth anniversary celebration of the College at Geneva two years ago. Fortunately he recovered and continues to serve as the careful pilot of our organizational ship, steering it onward on its successful voyage to ever greater scientific and humanitarian achievements.

"In reviewing with Dr. Thorek some of the problems of our intricate international organization, I had the opportunity of suggesting a plan for uniform contributions, dues and publication fees throughout the world, eliminating an impractical and confusing system that placed such transactions at the mercy of fluctuations in the values of the currencies of many countries. We also discussed the International Surgeons' Hall of Fame, a magnificent museum created by our College in honor of the great surgeons of the past. Brazilian surgery, with a special room of its own, is represented by four great men: Arnaldo Vieira de Carvalho of São Paulo, Brandt Paes Leme of Rio de Janeiro, Hugo Furquim Werneck of Belo Horizonte and José Pires de Formiga, Minas Gerais. Our country is now among those best represented in the museum. Added to the Brazilian Room recently was the first x-ray set to have reached South America—one

made under the personal supervision of Konrad Roentgen. It was originally sent to the State of Minas, where Dr. José Ferreira Pires got it to work after tremendous difficulties, including the need to produce electric energy—not then available in the area—for the running of the machine.

"Brazil's President, Dr. Juscelino Kubitschek de Oliveira, who is also a member of our profession, expressed his recognition of the importance of our mission when he made possible a donation of \$5,000 toward the equipment of the Brazilian Room of the Hall of Fame.

"Dr. Thorek and I agree that the International College continue to extend aid in catastrophes as in the past, as we did in World War II, during the floods in the Netherlands and, most recently, during the Hungarian crisis.

"I should like again to thank everyone for the honors extended to me. This ceremony expresses your friendship, fraternity and patriotism. Dr. Matheus Santamaria, my classmate of thirty-two years ago, has received many honors attesting to his qualifications as one of our finest urologists. His tireless efforts at the clinics and hospitals of São Paulo have earned him his place as Head of the Urologic Clinic of Charity Hospital, one of the finest urologic centers of our country. His work on the Technical and Administrative Council of Santa Casa has consisted largely of solving problems of hospital organization. His numerous contributions to professional journals and his scholarly approach have brought him his appointment as Professor of Urology of the University of Medicine and Specialization now being organized at São Paulo Charity Hospital. To us, Matheus Santamaria represents a vital force for the advancement of the ideals of the International College of Surgeons. When he was President of the Brazilian Section, he made good use of this splendid opportunity to promote friendship and solidarity among our members, to the great advantage of our College. He and his co-workers, in preparing this extraordinary meeting,

become negative In one case the reaction was slightly increased in intensity

This result suggests that in most cases of puerperal infection, unlike scarlet fever, little if any Dick toxin is elaborated by the streptococcus in the mother's body In cases of very severe infection, however, such as those of diffuse peritonitis, which permit of an enormous proliferation of the cocci in the body, it would seem that Dick toxin may be produced in considerable quantity, as the following records show

RECOVERY OF DICK TOXIN FROM THE PERITONEAL EXUDATE IN CASES OF PERITONITIS

Case 1 Mrs C-p A fatal case of diffuse peritonitis with intense scarlatiniform rash, died on the 10th day of puerperium The purulent exudate obtained from the peritoneal cavity *post mortem* (16 hours after death, 14 in refrigerator) gave a pure culture of hæmolytic streptococci After being filtered through muslin and a Seitz disc the exudate was found to be sterile and the following tests were carried out

Toxicity and skin tests on animals

	Amount injected and route	Result.
1 rabbit	7 c c, intravenous	Died within 24 hours with distension of intestines Heart blood sterile
1 guinea pig	5 c c, intraperitoneal	Remained well
2 mice	0.4 c c, "	"
2 "	1.0 c c, "	One "remained" well, the other died on the third day with congestion of duodenum and jejunum

Intradermal injections of the filtrate into rabbits gave reactions similar to those produced by Dick toxin and the blocking of these reactions by mixture with "scarlet fever antitoxin" indicated that the filtrate contained approximately 100,000 skin test doses of Dick toxin per c c For these intradermal tests on the rabbit we are greatly indebted to Dr Buttle of the Wellcome Physiological Research Laboratory

Skin tests on man

Mrs L, Dick positive, was injected intradermally with 0.2 c c of undiluted filtrate Three hours later she had a sharp rigor and some cyanosis Her temperature did not rise at first, but 8 hours after the injection it reached 103° F On the following day it was not above 99.6° F, but the patient still experienced some *malaise* The local skin reaction reached 8×5 cm three hours after the injection and was still bigger next day, and somewhat painful The erythema lasted nearly a week

L C, Dick negative, received 0.18 c c of undiluted filtrate intradermally after it had been kept a week in the ice chest Within half an hour there was a raised swelling about 6×4 cm This subsided, but was followed,

AN APPRECIATION

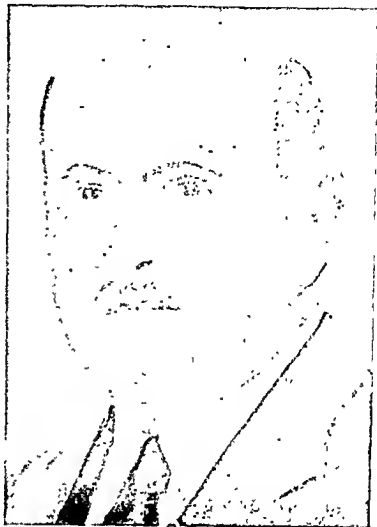
PROF. DR. FRANCISCO GRAÑA,* F.A.C.S., F.I.C.S. (Hon.)

Past President of the International College of Surgeons

The last brilliant International Congress which was held in Chicago last September in conjunction with the twenty-first Annual Assembly of the United States and Canadian Sections has passed into history, and a remarkable record it is in the annals of the International College of Surgeons. We had with us outstanding scientists and distinguished Fellows of the College from all parts of the world as well as master surgeons whom it was our privilege to honor. This Congress has already been chronicled, and it is not my purpose to repeat what has been written in previous issues of this Bulletin.

To one who has been with the College since its infancy, having served as International President and having welcomed the International Congress in my own home city of Lima in 1946 and having journeyed to many lands and often to the United States for these distinguished assemblies, this past Congress was a most memorable one. The reason is one that our younger men may take too much for granted, like sunlight that is missed only on a dull day. We had with us once again our leading spirit, our universal light and, with all, our very human and beloved Founder, Max Thorek. He had "taken it easy" (?) for a brief period, due to the after effects of viral pneumonia contracted in Geneva. His presence among us once again was like the lighting of a guiding beacon.

This short tribute is frankly an appreciation from a devoted colleague of many years' standing, written to give our younger Fellows some small glimpse of the truly great man, with a great heart and exceptional talents, who has opened our collective hearts to the world through the founding of our International College of Surgeons.



Dr. Francisco Graña R.

In the course of human endeavors, men of great vision discover hidden truths, reach new horizons, propose new procedures. Then, after a long time other men complete the work, so that science and society may benefit. Only in rare instances does an idealist, a genius, realize and live to see his dream become a reality. Max Thorek is the rare soul who has received this blessing. It was not, however, a blessing showered down from the skies by the whimsy of Destiny. First, he had the dream, and the beauty of his dream so possessed him with a vision of universal understanding and sharing of knowledge and brotherhood in science that every converse opinion, every setback that weakens

*Professor of Surgery, San Marcos University, Lima, Peru.

yet know whether cases dying of peritonitis *without a rash* have erythrogenic toxin in the exudate

DISCUSSION

The hypothesis that a patient's inability to neutralise the erythrogenic toxin of the hæmolytic streptococcus facilitates invasion of her tissues by that organism is not borne out by the skin tests of puerperal fever cases recorded in the earlier part of this paper. Streptococcal infection attacked Dick-positive and Dick-negative women in about the same proportion as Dick-positive and Dick-negative reactions were encountered among normal adults. This finding does not support the view that active immunisation of all pregnant women, or of Dick-positive women, by the injection of the erythrogenic toxin would be of any value for the prevention of puerperal fever.

Passive immunisation by the injection of a potent antitoxic serum at the time of or shortly before labour also rests on no scientific basis, since all the sera so far produced which have proved capable of protecting animals against a streptococcal invasion have done so only against the homologous type of streptococcus. A serum to be of value as a prophylactic remedy against puerperal infection must be capable of preventing invasion by any one of many types.

The use of antitoxic serum for curative purposes might seem to have more justification in view of the fact that the production of erythrogenic toxin in the peritoneal cavity has been demonstrated. It seems clear, however, that there could have been no hope of neutralising anything like the quantity of toxin which was present in our two cases of peritonitis at the time of death. Whether the administration of antitoxic serum might have increased their chances of recovery if given at the very beginning of the peritoneal infection we cannot say, but it appears very unlikely in view of the fact that the many attempts in the past to save animals experimentally infected by the intraperitoneal route by means of serum given *after* the infection have almost invariably been unsuccessful. In many cases the animals so treated have died somewhat earlier than the untreated controls.

An analogous unfavourable effect of serum treatment in human cases was also strongly suggested by the data recently reported by one of us (Colebrook, 1935). The analysis of cases recorded in that paper has since been continued for a further twelve months, *i.e.* until September 1935. The complete record may be summed up as follows. Among all the 55 cases of puerperal infection by hæmolytic streptococci who received antitoxic or "antistreptococcus" serum before admission to Queen Charlotte's Hospital during 1930-35 there were 25 deaths, a mortality rate of 45.5 per cent. Among all the 431 cases similarly infected who received no serum at any

From the Executive Director's Notebook



Dr. Ross T. McIntire
F.A.C.S., F.I.C.S.

Before discussing the plans for 1957 I would like to go back for a few minutes to mention a most pleasant Christmas party held by the Regent, the Officers and the members of the Credentials Committee of the State of New York in New

York City on Dec. 18, 1956.

Dr. John Sauer, who is the Treasurer of the New York State Chapter, is a member of the 7th Regiment—which is one of the famous National Guard regiments of the United States, with a history of participation in all of our wars and with outstanding records in each and every one of them. The Christmas dinner of the New York Chapter is always held in the Armory as a courtesy, extended to Dr. Sauer. A most pleasant social evening is combined with an annual business meeting, at which plans are laid down for the coming year.

This party has been restricted to the officers and members of the Credentials Committee of the State. It has been of such value that a motion was made and passed at the recent meeting to extend this Christmas party to the entire membership of the State. This is a real step forward, and it is expected that at least six or seven hundred of the New York members will take advantage of this means of getting together. Dr. Horace E. Ayers is to be complimented upon the continued activity that takes place the year round. Dr. Max Simon of Poughkeepsie will serve as President of the New York State Chapter during 1957.

Plans for the joint meeting of the New York State Chapter and the Canadian Section are completed, and the meeting at Lake Placid promises to be one of the outstanding affairs of the year. We all re-

member the great success of the Niagara Falls meeting last year. It is hoped that all who can will journey to Lake Placid on May 30-June 2 for this very fine meeting.

The scientific Congress to be held in Mexico City on February 24-28 promises to be an outstanding success. Prof. Dr. Manuel A. Manzanilla is the President of the Arrangements Committee. The President of the Republic of Mexico will address the Congress on Tuesday morning at 9:00 a.m. in the auditorium of the School of Medicine in University City. Many members of his Cabinet are expected to attend this meeting.

The opening session on Monday, February 24, will have as its speaker Dr. Raoul Fournier Villada, Director of the School of Medicine, National University of Mexico. Dr. Villada is an outstanding surgeon in his own right and will appear later on the program. On the opening day, the Secretary of Public Health and Welfare of the Republic of Mexico, Dr. Ignacio Morones Prieto, will address the Congress on the subject of public health—which is one of the four principal themes of the Congress.

Round table discussions, with eminent surgeons from many parts of the world, are scheduled throughout the Congress. Surgical operations of all varieties will be conducted in the various operating theaters on Thursday, February 28. It is planned to have audiophones installed, so that language translations can be carried on simultaneously.

Surgeons from South America, Europe, Egypt, Japan and the Philippines will appear on this program. A delegation of some three hundred persons from the United States is expected to attend. The closing session of the Congress will be a most colorful meeting, to be conducted on Thursday at 8:00 p.m. by the Secretary of Public Health.

The social events throughout the Congress period will be colorful and spectac-

programs that attract the surgeons in our families, our Woman's Auxiliary is given every opportunity to participate in the aims of the College. We, in turn, try to make the social aspect of the assemblies equally attractive.

It was our good fortune at our last Congress to be host to the wives of some of the world's foremost surgeons from other lands. Besides Madame Pandalai from Madras, whom I have already mentioned, there was Señora Gama—wife of Prof. Dr. Carlos Gama, of the University of São Paulo, and the International President of the College—beautiful and statuesque as a mythical goddess, yet down to earth in her friendliness. There was the serenely lovely Madame Nicolet from Bern, Switzerland, so genuinely interested in our young people, the sons of our surgeons, studying in her country. There was Madame Raymond Darget from Bordeaux, the epitome of true French charm and chic. There were many others whom I cannot name for lack of space.

It was wonderful to have the opportu-

nity to meet these ladies intimately over tea in our hospitality room and at the more formal functions of the College. We had remarkable evidence on all sides of the understanding and pride that these women, as well as our own, take in their husbands' work and in their affiliation with the International College of Surgeons. Those of us who have been able to attend Congresses held in other countries can never forget their cordiality to us.

The next International Congress will be held in Mexico City, Feb. 24-28, 1957. The organizing committee is headed by Prof. Dr. Manuel A. Manzanilla, and we all had very sincere and cordial invitations from the "muy simpática" Señora Manzanilla. From all indications we shall have a good representation there, and it will be an ideal time to visit Mexico.

I think there will be no doubt as to whether we of the International College have a Woman's Auxiliary, and to every woman qualified to become a member, we invite you again and again to join us.

—Catherine M. Dance

GROUP PROTECTION AGAINST SUIT FOR MALPRACTICE

Comprehensive Insurance for Members of the
United States Section, International College of Surgeons

The response to the group plan for insurance against suit for malpractice, offered to members of the International College of Surgeons, has been most gratifying. The only exclusions from the comprehensive coverage are for criminal acts, for services rendered under the influence of intoxicants or drugs and for the performance of any operation to produce sterility, unless the insured person shall be able to establish pathologic indications for such operations. An extra premium is required for plastic surgery and radiologic therapy.

The underwriters are represented in each State. They will defend any claim or suit alleging malpractice to the limit of liability and will also pay expenses incurred in the defense. A committee of members of the International College will assist in the defense of members covered by the plan. The underwriters will not settle any claim without the consent of the insured person. The master contract will remain with the Executive Director of the International College, and certificates of insurance will be issued to participants. All inquiries regarding individual coverage, partnerships, employed physicians and so forth should be directed to *John L. Krause and Associates, 29 South LaSalle Street, Chicago 3, Illinois.*

consistence and on section was of a general pinkish-red colour, with here and there paler firmer areas in which streaks of hæmorrhage were present. Scattered irregularly through the splenic substance there were also a number of dark purple-red, more or less spherical nodules of much firmer texture, varying in size up to about $\frac{3}{4}$ in in diameter. The liver was much enlarged, smooth and pale and weighed 121 oz. It was firm and elastic and on section was of a general pale whitish-yellow colour. There was no indication of tumour growth in the hepatic substance and naked-eye tests for iron and for amyloid were both negative. The kidneys (7 oz each) were enlarged and pale, their capsules were not adherent and their surfaces were smooth. On section the cortex was swollen and pale and its markings very indistinct. The other abdominal and pelvic organs did not show anything noteworthy. The mesenteric and retro-peritoneal glands were not enlarged. The lungs were the seat of hypostatic pneumonia. The heart weighed 14 oz, its muscle was pale and unduly soft and the cavities were all dilated. The cusps of all the valves were normal and the coronary arteries appeared healthy. The brain presented no abnormality. In the marrow cavity of the femur there was a moderate hyperplasia of cellular marrow, with disappearance of the fatty marrow, most apparent at the lower end. There was no evidence of absorption of bony trabeculæ, but on the contrary these appeared rather more numerous and of coarser texture than normal. At the upper end of the femur there was a suggestion of sclerosis of the spongy bone.

Microscopic examination

The appearances in the spleen examined post-mortem were very striking. Representative portions were taken for microscopic examination from the general splenic substance and from the purple nodules.

The sections from the splenic substance showed dilatation of the sinusoids and fibrosis of their walls, and general fibrosis of the pulp (fig 1). The coats of the arterioles were thickened and areas of periarterial hæmorrhage were present, there were also areas of diffuse hæmorrhage in the pulp. The malpighian bodies showed considerable atrophy. A few typical siderotic nodules were noted, these were the only areas in the spleen to give a positive reaction for iron. Within the sinusoids and scattered through the pulp were groups of erythroblastic cells, and around these were numerous larger cells having the characters of immature white cells (fig 2). Occasional small multinucleated giant cells were also present. The oxidase test applied to frozen sections showed that a high proportion of the cells in the splenic pulp gave a positive reaction (fig 3).

the medical school. He served as a urologic surgeon for twelve years, she as a pediatrician for six.

In company with a professor of agriculture from the same university, his wife and two boys, the two doctors and their baby set out for the Austrian border, 200 miles away, in a milk truck. The friendly driver took them to within a few miles of the border. The party walked less than a mile when they were captured by secret police guards and their real troubles began. They were taken to a barn where 60 other refugees were interned; they were kept there for two days and nights. There were no facilities of any kind, only trampled straw on the floor. A friend recognized the agricultural professor and his family and somehow managed to engineer their escape under the cover of darkness. The two doctors never saw their friends again after that night.

On the morning of the third day all of the refugees, including Laszlo and his wife, were herded into a truck which was to take them to a larger and more permanent Russian prison camp. As the truck was being unloaded near the camp, one of the refugees bolted and ran. The two guards took out after him and when they did the other refugees ran wildly in every direction—across fields, down roads and through woods.

"We ran and when we were tired we ran some more," said Dr. Elizabeth. She and her husband and the baby were befriended by a doctor they knew in a nearby city. He put them aboard a bus with other refugees heading for the border.

"The bus driver let us out at the border, but we soon learned that we still had a quarter of a mile to go," Dr. Elizabeth said. "We never knew when we actually crossed the border. We put the baby to sleep and walked and ran for three hours in the dark, always fearful that we might be going the wrong way. Finally we spotted the Austrian watch tower and knew we were safe.

"The baby came through the rough trip quite well, except for a large lacerated

swelling on the right temple. This was caused by the jostling he got when we were running and stumbling toward our destination. The baby apparently lay in one position and its head rubbed against the basket for quite some time."

"Have you ever heard of the American Medical Association; do you know anything about the organization?" Dr. Laszlo was asked.

"Of course," he said, adding: "We were well acquainted with your publications while we were at the University, but the name meant much more to us when we reached a refugee physician processing center in Vienna. It was there that we received 500 Schillings (\$20) apiece and we will be forever grateful. They told us the money represented contributions from several medical organizations and they mentioned the American Medical Association.

"Hungarian medicine today is—to use an American expression—in a mess. The urologic staff at the university hospital consisted of 20 physicians. On the day we left there were only three and one of them was an old physician who was ill, leaving only two.

"The revolution," he continued, "was started by students. Since we were on the teaching staff, the Russian masters hold all teachers responsible. Even before we left, a general housecleaning of the teaching staff was started. Teachers are being substituted by party followers who can be trusted with indoctrinating the youth in Russian ideologies and practices.

"Neither my wife nor I were members of the party, that is why we were never able to get on the clinical staff of the university. Our jobs carried a great deal of prestige but little salary."

Dr. Laszlo said that the medical university curriculum is being filled, more and more, with military subjects, socialist theory and the Russian language.

"A great amount of time is being spent on nonprofessional studies," he said.

Dr. Laszlo and his wife have no immediate plans for the future exc

American Medical Association Awards Citation to CIBA for Its Television Series

The American Medical Association, at its Tenth Annual Clinical Meeting in Seattle, presented a citation approved by the Board of Trustees of the A.M.A., to CIBA Pharmaceutical Products Inc., for service to the medical profession through its television program, "Medical Horizons." The program consists of documentary reports on the latest developments in medical science, and is televised each week directly from important hospitals, clinics and laboratories of the United States.

Running for its second full year, the

current series of 39 programs will involve more than 100,000 miles of travel on the part of the staff producing it. Among the institutions to be visited are the Mayo Clinic; Duke University; the University of Georgia; the University of Pennsylvania; the University of California; Cleveland Clinic; the United States Naval Base in New London, Connecticut; Rockland State Hospital in Orangeburg, New York, and Sinai Hospital in Baltimore, Maryland.

The citation, presented by Dr. Dwight H. Murray, President of the A.M.A. to T. F. Haines, President of CIBA, was given for the accurate and dramatic portrayal of the story of medical progress and the work and achievements of doctors.

The Research Horizon

Comparison of Billroth I and Polya Technics

Widespread disagreement over the late results of the Billroth I and Polya resections for duodenal ulcer led Drs. J. C. Goligher, P. J. Moir and J. H. Wrigley to survey the effects of the operations among 312 patients who had undergone gastric resection. Their report appeared in *The Lancet*, Feb. 4, 1956. The Billroth I technic was performed in approximately half of the cases. The authors concluded that the Billroth I operation, even though extensive, is unsatisfactory, carrying a 17 per cent recurrence rate within three years, as against 2 per cent after the Polya operation. The Billroth I technic eliminated postgastrectomy symptoms, except biliary regurgitation or manifestations of recurrent ulcer, no more effectively than did the Polya technic. The patient's condition is slightly poorer after the Billroth I resection. The Billroth I technic, when the ulcer is fixed or, after high resection, when it is difficult to approximate the duodenum and the stomach remnant, is technically not feasible. Routine application of the Billroth I technic might increase operative mortality rates. These investigators find no justification for the Billroth I

technic as primary surgical treatment for duodenal ulcer. They concede, however, that to relieve severe bilious emesis after a Polya operation, it may be necessary to convert the anastomosis to the Billroth I type in order to eliminate incapacitating vomiting, at the risk of recurrence of the ulcer.

Management of Massive Gastrointestinal Hemorrhage

Drs. Angus Cameron and J. F. Hughes, reporting in the *Delaware State Medical Journal*, July 1956, attribute 8-10 per cent of bleeding in massive hemorrhage from the upper gastrointestinal tract to esophageal varices. The varices in 80 per cent of the cases are secondary to portal hypertension, resulting from extrahepatic, intrahepatic or suprahepatic blocking of the portal venous system. A sudden increase in the pressure gives rise to the hemorrhage. The treatment consists of prompt insertion of a Sengstaken-Blakemore tube for temporary control, failing which intraesophageal suture-ligature of the varices becomes essential. The hemorrhage is controlled by direct ligature through a longitudinal incision, by left transpleural approach, in the esophagus and upper portion

exaggerated movements associated with certain types of cerebral palsy. The promise offered by this operation is far greater than that secured by any other means. Of the 30 patients, 1 died post-operatively.

Primary Rhabdomyosarcoma of the Heart

The first recorded instance of primary malignant growth of the heart in the Philippines is discussed by Drs. Juan Z. Sta. Cruz and Desiderio S. Sta. Ana in *The Journal of the Philippine Medical Association*, May 1956. The patient, an 8-year-old boy, had persistent dyspnea, which had, since the age of 5, recurred in attacks lasting two to three days. By the age of 6, he had repeated attacks of epistaxis and migratory pains of the knees and elbows. Nausea and vomiting began three days before hospitalization, at which time pronounced dyspnea was accompanied by cold sweat and pallor. He was brought to the hospital in semiconscious state. The clinical diagnosis was rheumatic heart disease, active with mitral regurgitation and mitral stenosis; complete heart block (Adams-Stokes), and acute bronchopneumonia. Throughout 63 days in the hospital, the attacks of dyspnea continued to recur and progressive bradycardia was noted. Finally fever, loss of consciousness, convulsions and death followed.

Autopsy disclosed a heart, weighing 249.5 Gm., with a smooth translucent epicardium. A bulging mass, 3.5 cm. in diameter, was noted over the interatrial septum with the tricuspid valve straddled over it. The growth was soft and covered by a smooth, glistening endocardium. The right ventricle was 0.3 cm. thick, the left ventricle 0.4 cm. Originating from the atrial septum was a large pedunculated cauliflower growth, 4 x 3.5 x 2.5 cm., severely obstructing the mitral orifice and occupying a large portion of the left ventricular cavity. The mitral valve was normal, the left ventricle dilated but not hypertrophied. Midsagittal section through the atrial and ventricular septa, through the growth in the left ventricle, disclosed a soft, greyish

encephaloid mass, 3.5 x 3 x 2.7 cm. in the atrial septum and perforating the atrial wall continuous to the pedunculated cauliflower mass in the left ventricle. The coronary arteries were normal. Histologic investigation confirmed primary rhabdomyosarcoma. The pronounced obstruction produced by the growth in the mitral orifice simulated mitral stenosis and insufficiency, rheumatic in origin, with complete cardiac blocking.

Report on Crippled School-Age Minors in Sapporo

The medical staffs of the Department of Orthopedic Surgery of Sapporo University of Medicine and the Hokkaido Shishi Gakuin conducted a joint statistical survey in the autumn of 1953 among crippled minors in Sapporo, Japan. Results of the survey are discussed by Bun-ichiro Kawamura *et al.* in *The Sapporo Medical Journal*, February-March, 1955. Of 61,587 students examined, 503 (0.81 per cent) were crippled and 122 of that number were, for various reasons, unable to attend school. Of the 503, 157 were paralytic, 146 of them because of poliomyelitis; 114 had congenital deformities; 70 had tuberculosis of the bone and joint; 63 had spastic disease; 58 had disability resulting from injury; and 48 were classified in a miscellaneous category. Of the group who were unable to attend school 41.5 per cent had congenital deformities. Crippled children who required immediate orthopedic treatment and were also classified as a group expected to improve by specific treatment numbered 412. In all, 67 of the children had never been given any kind of treatment.

It was concluded that many families, out of shame, try to conceal the crippled child; that superstition, ignorance and indifference stand in the way of preventive measures as well as medical treatment; that orthopedic treatment is often beyond the means of the child's family; that an alarming number of children receive either inadequate or harmful, misguided non-



FOUNDED BY DR. MAX THOREK

The Journal of the International College of Surgeons

FOUNDED IN GENEVA, SWITZERLAND, 1935 - INCORPORATED IN WASHINGTON, D. C., 1940

Vol. XXVII

MARCH, 1957

No. 3

Plastic and Reconstructive Surgery

Immediate Treatment of Traumatic Injuries of the Face

NEAL OWENS, M.D., F.A.C.S., F.I.C.S., AND MARK GORNEY, M.D.

NEW ORLEANS, LOUISIANA

OF the countless medical accidents confronting mankind today, few present the baffling complexity of the improperly treated severe craniofacial trauma. It is somewhat saddening to observe that while world-wide medical progress is advancing in giant strides and immeasurably improving the lot of humanity, the technologic advances of the past decades have far outstripped human abilities to cope with them. As a result of faster cars and planes, increasingly complex machines and the constant threat of political instabilities dragging us into a disas-

trous conflict, the emphasis on traumatic surgery is much on the ascendancy. The responsibility for the care of injuries in many instances will rest upon the nearest doctor at hand, regardless of special training. The outcome of the case will often depend on what is done (or, probably more important, what is not done) by the first person to see the case. Anyone who treats craniofacial trauma should be aware of the bizarre psychiatric trauma, let alone the physical complications, that an improperly treated facial injury can bring on. A maimed or crippled person can still assume his place in society; a distorted face, whether on a real or an imaginary basis, presents far greater difficulty in adjust-

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.
Submitted for publication Sept. 21, 1956.

the lower portions of the shaft osteosclerosis was absent, but the marrow showed gelatinous transformation with loss of fat (fig 10), while scattered through it were rather numerous small areas of hæmopoiesis, both erythroblastic (fig 11) and leucoblastic (fig 12) in character. In these foci the nucleated red cells were of the normoblast series, as in the spleen. Leucoblastic foci consisted chiefly of primitive myelocytes with small numbers of myeloblasts and also of more mature granular cells. Megakaryocytes were present but were rather less conspicuous than in the spleen.

Commentary

The most noteworthy feature of this case, apart from the unusual degree of the myeloid transformation in the spleen, is that, although post-mortem examination revealed anatomical changes in the spleen, liver and marrow such as are usually associated with leuco-erythroblastosis, yet the changes in the blood were not diagnostic and gave no indication of the nature of the condition present. Leuco-erythroblastic anæmia has been defined (Vaughan) as "an anæmia characterised by the presence in the peripheral blood of immature red cells and a few immature white cells of the myeloid series." In the present case the blood picture was merely that of a secondary anæmia of moderate degree and immature cells were absent. McMichael and McNee found that the hæmatological features of leuco-erythroblastosis showed extreme variation and fluctuation, and that in consequence diagnosis was difficult without repeated blood counts. In this case, however, immediate surgical intervention appeared to be called for and there was thus no opportunity for blood examination over a period. It may be noted also that the microscopic appearances in the wedge taken from the spleen at biopsy were misleading rather than helpful in diagnosis. The presence of circumscribed nodules of myeloid tissue in addition to the transformation of the pulp appears worthy of comment, as in most cases of myeloid metaplasia previously recorded the changes throughout the spleen would seem to have been of a diffuse character.

Summary

A case of splenomegaly with myeloid transformation of the splenic pulp is reported. Although the anatomical changes generally associated with leuco-erythroblastosis were found, the usual hæmatological features of that condition were absent.

REFERENCES

- McMICHAEL, J, AND MCNEE, Leuco-erythroblastosis, *Edinb Med J*,
J W 1936, xlii 303
VAUGHAN, JANET M Leuco erythroblastic anæmia, this *Journal*,
1936, xlii 541

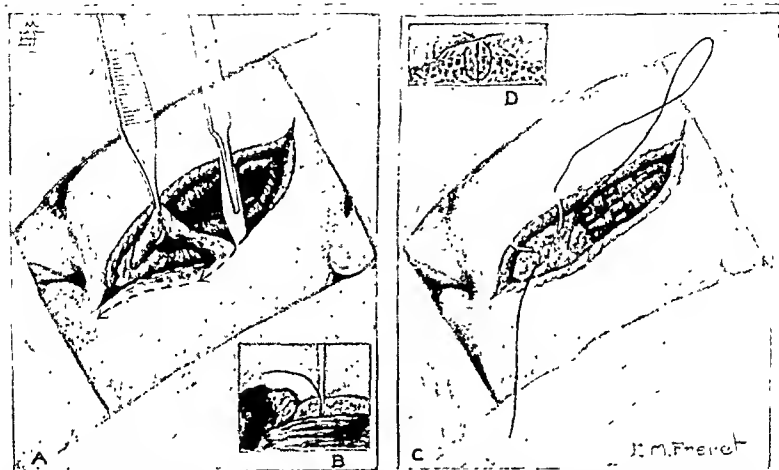


Fig. 3.—A, debridement of all devitalized tissue. B, blade at right angle to plane of skin. C and D, subcutaneous approximation with horizontal mattress sutures in the musculature.

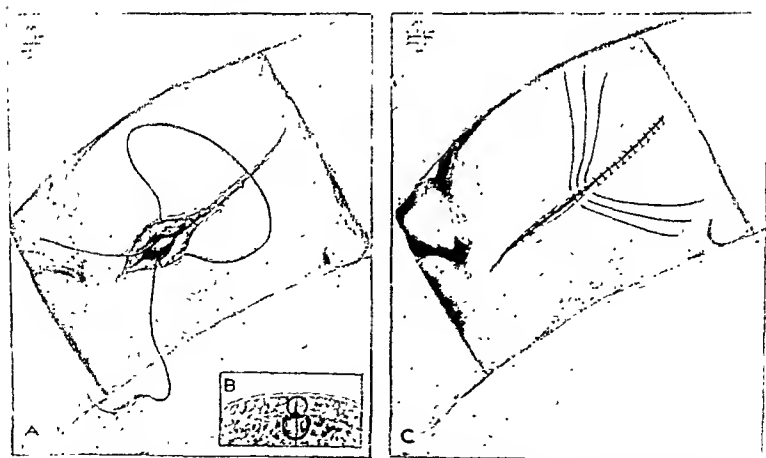


Fig. 4.—A and B, closure continued in anatomic planes, subcutaneously sutured and buried.

normal A blood count revealed the picture of an orthochromic anaemia — Hb 44 per cent, R B C 2,120,000, W B C 2500 A differential count showed the white cells to be present in normal proportions No immature red cells were seen but there was a slight degree of anisocytosis and poikilocytosis Sternal marrow puncture showed marked anisocytosis and poikilocytosis but no megalocytosis Erythropoiesis was of the normoblastic type The blood Wassermann reaction was negative

A fractional test meal showed complete achlorhydria after histamine A barium meal and a chemical and bacteriological examination of the stools showed no abnormality

Shortly after admission the patient developed bronchopneumonia and death rapidly ensued

Post-mortem examination

An autopsy was performed four hours after death The body was that of a very wasted man Early rigor mortis and hypostasis were present There was a scar of an abdominal incision in the right iliac fossa

The *brain* and *spinal cord* were not examined

The *pericardium* was normal The *heart* was atrophic but otherwise normal The *aorta* and main *arteries* were free from atheroma

There was well marked pleurisy over the upper lobes of both lungs but no effusions The *trachea* and large *bronchi* contained no pus The *lungs* were somewhat emphysematous and areas of consolidation were present in both upper lobes

The *peritoneal cavity*, *tongue*, *nasopharynx*, *oesophagus* and *stomach* were normal In the lower four inches of the *ileum* numerous small shallow ulcers were present They had no definite relationship to Peyer's patches, the gut wall was not thickened and there was no stenosis On the serosal aspect there was no reaction and no suggestion of subperitoneal tubercles In the *large intestine* one or two stercoral ulcers were present in the pelvic colon

The *liver* was atrophic and fatty no free iron was present The *gall-bladder* and *pancreas* were normal

The *spleen* weighed 300 g and measured 11×6×5 cm Its outer surface was slightly nodular and of a deep purple colour there was no perisplenitis The splenic and portal vessels were normal, showing no evidence of atheroma or thrombosis On slicing the spleen a large amount of blood escaped and continued to do so for some time after incision The cut surface was of a terracotta colour, coarsely nodular and of soft consistency The nodules of tissue were irregular in size and shape and separated from one another by areas filled with blood, which also had a very irregular outline No malpighian bodies could be seen and there was nowhere any suggestion of an outline of an infarcted area Numerous slices of the spleen were cut but it everywhere presented the same appearance, which could only be taken for that of massive necrosis

face, emphasizing the absolute necessity of gentle handling throughout, and the fact that the prime consideration in dealing with a craniofacial injury is to make sure of an adequate airway. Hemorrhage must also be strictly controlled, and the extent of the injury investigated. The possibility of damage to the facial nerve must be investigated. The status of the teeth is most important.

In treatment, thorough cleansing of the wound is of the first importance. When tissue must be excised, the excision should be planned to follow Langer's lines (the natural lines) of tension on the skin. The author's technic is described and illustrated.

RESUMEN

Los autores discuten el tratamiento inmediato de emergencia de las lesiones de la cara, enfatizando el constante manejo fino y el hecho de que la primera consideración al tratar con una lesión cráneo facial es asegurar adecuadamente las vías aéreas. La hemorragia debe ser estrictamente controlada y la extensión de la lesión investigada. También debe investigarse la posibilidad de daño al nervio facial. El estado de los dientes es de suma importancia.

En el tratamiento, la limpieza meticulosa de la herida es de primordial importancia. Cuando haya que remover tejido, la excisión debe planearse siguiendo las líneas de Lange (las líneas naturales de tensión de la piel). Se describe e ilustra la técnica del autor.

RÉSUMÉ

L'auteur discute le traitement d'urgence immédiat des blessures de la face, soulignant la nécessité absolue d'une conduite

délicate durant tout le traitement. Il est essentiel que les lésions soient accessibles à l'air. L'hémorragie doit être strictement contrôlée, ainsi que l'extension des lésions. La possibilité d'une atteinte du nerf facial doit être envisagée. Le status dentaire est aussi des plus importants.

Lors du traitement, un nettoyage complet de la plaie est indispensable. Lorsque des tissus doivent être excisés, l'excision devrait se faire en suivant les lignes de Langer (lignes naturelles de la tension de la peau). La technique de l'auteur est décrite et illustrée.

RIASSUNTO

L'autore tratta la cura d'urgenza delle lesioni della faccia, sottolineando l'assoluta necessità di manovre delicate e l'importanza di assicurare la pervietà delle vie aeree prima di ogni altra cosa. Anche le emorragie devono essere controllate con cura. Si deve esplorare la lesione completamente, ricercare un eventuale interessamento del nervo facciale ed esaminare lo stato dei denti.

Un'accurata detersione della ferita è assai importante; quando è necessario sacrificare dei lembi di tessuto bisogna orientare la escissione secondo le linee di Langer che sono le linee naturali di tensione della cute.

Viene descritta ed illustrata la tecnica personale.

ZUSAMMENFASSUNG

Die sofortige Notbehandlung von Gesichtsverletzungen wird erörtert unter Hervorhebung der unbedingten Notwendigkeit eines durchwegs behutsamen Vorgehens sowie der Tatsache, dass bei Verletzungen des Gesichtsschädels in erster Linie die Sicherung freier Luftwege berücksichtigt werden muss. Von Wichtigkeit sind ferner sorgfältige Blutstillung,

10 of the 34 initially positive dirty cases negative cultures were obtained by swabbing the surface of the skin after preparation for taking the graft. A rinsed skin culture might be of more value than a blood culture in evaluation of the burned patient's condition.

Samples of skin not positive initially were cultured again in three weeks and in six weeks. In 40 per cent of the initially negative clean cases the cultures were positive in three weeks; in 16.6 per cent, in six weeks. In the dirty cases, 35.7 per cent of the initially negative cultures were positive in three weeks and 11.1 per cent in six weeks. It is possible that part of the increase was due to personal handling and air contamination. Other samples may have contained bacteria originally but not on the segment cultured. These categories are not considered valid enough for analysis.

The types of bacteria cultured had no relation to the "take" of the grafts, except in the 3 cases aforementioned. The types cultured were the usual contaminants of skin, nonhemolytic *Staphylococcus aureus* being by far the most common (Table 2). It is of interest that most of the patients with open wounds were being given anti-

biotics, with little if any effect on bacterial growth in the skin; at least, no association could be made in our analysis. It appears that skin should be used when taken or, if stored in an ordinary refrigerator, as soon as possible, because nearly 50 per cent of grafts even in clean cases are contaminated from the beginning. Since 68.4 per cent of the grafts in clean cases and 70.9 per cent of those in dirty cases are contaminated by bacteria in three weeks, this is probably a useful limit of time for refrigeration of grafts by this method.

SUMMARY AND CONCLUSIONS

One hundred samples of skin have been cultured. Thirty-eight were from "surgically clean cases" and 62 from "surgically dirty cases." Eighteen (36.8 per cent) of the samples from the former group and 34 (54.8 per cent) from the latter reacted positively on initial culture. The "take" of the skin grafts was good (95 per cent or better) in all but 3 cases and these were "dirty" cases in which proteus organisms were combined with nonhemolytic *Staphylococcus aureus*. As noted in the "clean cases," the skin is difficult if not impossible to sterilize by routine surgical preparation, but bacterial contamination by itself is not the usual cause of graft failure. In the "dirty" cases an increase in the number of initially positive cultures was out of proportion to the number of these cases (6 per cent) in which the grafts were taken from areas adjacent to open wounds. In 10 instances in which negative cultures resulted from swabbing the skin, samples of skin still yielded positive cultures. It is suggested that there is a pooling of bacteria in the skin similar to that observed by Price in the spleen, even when cultures of the blood are negative. Cultures of the skin may be beneficial in evaluating the bacteremia of the extensively burned patient.

TABLE 2.—Positive Cultures

No. of Cases	Type of Colony	Colonies/Plate
46	<i>Staphylococcus nonhemolytic</i>	1—300
18	Gram-negative rods	1—20
14	<i>Beta streptococcus</i>	2—3
5	<i>Bacillus subtilis</i>	1—3
4	<i>Staphylococcus hemolyticus</i>	1
3	<i>Bacillus proteus</i>	Plate Covered
3	Diphtheroids	1
2	<i>Alpha streptococcus</i>	3
2	<i>Aerobacter aerogenes</i>	1
2	<i>Neisseria</i>	1
1	Gram-positive rods	3

Summary of the pathological findings

The patient died from bronchopneumonia, which was the terminal event in the course of an untreated orthochromic anaemia. Ulceration of the lower ileum of unknown aetiology was present. It in no way resembled the changes described in chronic regional ileitis. In the spleen the red and white pulp had almost entirely disappeared, leaving the trabecular and reticular network apparently unaffected. The splenic vessels, both large and small, were free from disease and there was no thrombosis. The widespread necrosis of the spleen, therefore, must be toxic in origin. This unknown toxin may also have produced the ulceration of the lower ileum.

Case 2

Clinical history

A M, a man aged 21, an optician's assistant, was admitted to hospital in January 1936. Six weeks before admission diarrhoea commenced, accompanied by pain in the right side of the abdomen. The bowels were opened two to six times a day but the stools never contained blood nor slime and were normal in colour. The abdominal pain became progressively worse although the diarrhoea improved. Latterly vomiting had occurred occasionally after food. Apart from asthma, from which he had suffered for the past three years, the patient had previously been in good health.

Examination revealed tenderness over the right side of the abdomen but no swelling could be felt. The liver was palpable one inch below the costal margin. The blood pressure was 126/80. A centrifuged deposit of the urine showed a few red blood cells in each field but no casts, cultures were sterile, the blood urea was 68 mg per cent. A blood count showed Hb 60 per cent and a leucocytosis of 12,000 of which 9000 were polymorphs.

During the six weeks which elapsed between admission to hospital and death the patient became more and more cachectic and throughout ran a remittent temperature. No new physical signs developed at any time but a few days before death, in coma, a pustular eruption appeared on the face and extremities.

Post-mortem examination

An autopsy was performed forty-eight hours after death. The body was that of a very wasted man. Rigor mortis had passed off but hypostasis and early decomposition were present. The face and extremities were covered with a pustular eruption.

The brain and spinal cord were not examined.

The pericardium contained 2 oz of straw-coloured fluid. The heart was normal in size, its muscle was pale in colour but firm in consistency. In the wall of the left ventricle several yellow areas about 2 mm in diameter could be seen in the muscle immediately beneath the endocardium. There was no abnormality of the valves, coronary arteries or aorta.

The larynx was normal but the trachea contained a few pustules similar in character to those which were present on the

eral, however, we have been inclined to advise hearing aids for children with bilateral meatal atresia at a very early age, the exact time depending on the cooperation of the child and the ability of our audiologist to induce acceptance of a hearing aid. In many instances this can be successfully accomplished, so that the child with a relatively normal auditory nerve may learn

to speak satisfactorily. If the hearing aid is not satisfactory, a skin-lined opening into the antrum or middle ear cavity may be provided. In our series fenestration has not been necessary.

A normal drum membrane is never present in a patient with typical or complete meatal atresia. Operations to provide a skin-lined opening in the canal region in

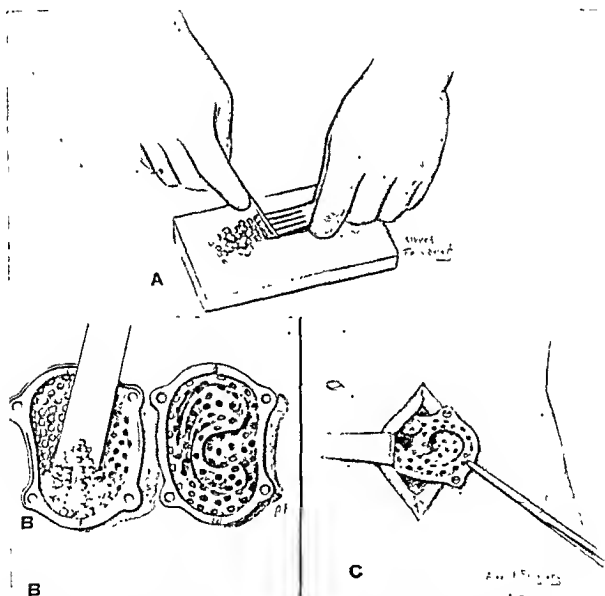


Fig. 1.—Formation of ear framework from diced cartilage grafts inserted in vitallium ear mold. *A*, rib cartilage removed from right side of patient's chest, diced into many small cartilage shavings. *B*, "diced cartilage grafts" introduced into each half of a perforated vitallium ear mold. *C*, halves of ear mold fastened together with vitallium screws, pressing the diced cartilage grafts into the shape of an ear. Mold containing segments of cartilage is inserted in pocket beneath the patient's abdominal skin. During a period of months, blood vessels and connective tissue grow through openings in mold and fasten separate segments firmly, simulating ear. When both auricles are being reconstructed in a young child, diced cadaver cartilage is used to supplement the child's own cartilage, so that there will be sufficient cartilage to fill both right and left ear molds. The operative procedures for the two ears are carried out simultaneously. Thus, the total number of operations for reconstructing two auricles is the same as for reconstructing a single auricle. The vitallium ear molds are made by the Austenal Company of New York City. Medium and large models are available to meet the general requirements of individual cases. *Reproduced by courtesy of Plastic and Reconstructive Surgery (3:653, November 1948).*

involved, the arterioles and the larger arteries and veins had escaped, and no evidence of arteriolo- or arterio-sclerosis could be seen. In the advanced stage of the lesion the entire wall of the affected vessel was replaced by homogeneous, acidophilic, necrotic tissue. The lumen of the artery contained an organised and in some places partly re-canalised thrombus. The periarterial tissues were infiltrated by mononuclear cells, the majority of which were macrophages, but a few were plasma cells and lymphocytes. Only an occasional polymorph was present. No aneurysms were seen in any of the affected vessels.

In some arteries the early stages of the arteritis could be seen. A small focus of hyaline degeneration was present in the media surrounded by several multinucleated giant cells (fig 3). The adventitia contained a few mononuclear cells, but polymorphs were absent. Sections stained by Gram's method revealed no organisms in the necrotic areas.

In the *heart* the small yellow areas seen beneath the endocardium at autopsy consisted of necrotic and thrombosed arteries. No microscopic areas of necrosis, however, could be found in the heart muscle.

Sections of the ulcers in the *stomach* and *large* and *small intestine* showed, in all cases, necrotic vessels in the submucosa. The ulcers were shallow and extended down to but did not breach the muscular coat.

In the *liver* an occasional artery was necrotic and thrombosed but no microscopic areas of necrosis were present. In the *pancreas* large areas of necrosis were seen and the arteries were extensively involved.

The multiple necrosis of the *spleen* (fig 4) was due to widespread involvement of the trabecular arteries by the necrotic process. In the infarcted areas the follicular arteries with their surrounding sheath of lymphocytes were frequently well preserved, whilst the parenchyma around them was almost structureless and acellular. The trabecular and reticular network in the necrotic areas stained normally and had apparently not been destroyed. Here and there between the infarcts small zones of normal splenic tissue were present.

Sections of the *kidneys* showed numerous anæmic infarcts produced by necrosis of the interlobular and larger medullary arteries. The kidney tissue between the infarcts was normal.

The *lungs* were congested but the vessels showed no abnormality.

Sections of the *marrow* showed a normal degree of erythro- and leucopoiesis.

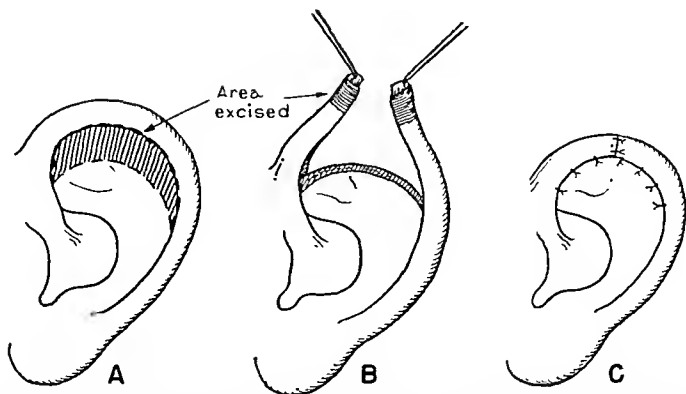


Fig. 5.—Sketch showing how height of reconstructed auricle or that of normal auricle may be reduced by excising a complete segment of cartilage and skin. The two auricles must match in height as well as angle.

years of age and has sufficient costal cartilage to provide structural support for the new auricle. The ear may thus be completed when the child is 5 years old, which enables him to enter school without a marked physical handicap and facilitates adjustment with other children. Since a child's ears are relatively large, the new auricle is made only slightly larger than the normal ear on the opposite side. If inequality in size develops later, the size of the larger ear may be reduced. Usually the larger ear will be the normal one, and it is relatively simple to reduce a normal ear so that it conforms in outline and contour with the reconstructed auricle.

Operative Technic.—Although reconstruction of an auricle is admittedly one of the most difficult problems facing the plastic surgeon, developments in this field during the past fifteen years have resulted in a general improvement of postoperative results. The technics used by different surgeons may appear somewhat diverse, but actually the basic principles are quite

similar. In all auricle construction a framework must be provided for the new auricle in the region of the absent ear, and this framework must be covered with skin which, to an acceptable degree, conforms to the external contour of the framework. Transference of the ear lobe, which fortunately is usually present, into normal relations with the skin-covered framework, and the transplantation of skin to cover the posterior surface of the new auricle are standardized procedures.

Unfortunately, after this has been accomplished, some hair-bearing scalp skin is usually present on the upper portion of the new auricle, and a bald or hairless area of skin is seen above the auricle if an Esser inlay has been used. A hairless Wolf graft from behind the normal ear or from above the patient's clavicle may be used to replace the hair-bearing skin on the new ear, and hair-bearing scalp flaps may be brought down to substitute for the bald area above and behind the ear.

In centers where large numbers of auri-

angle-lobe relation than was detailed and refined reproduction of the normal auricular structure.

The most satisfactory auricles were those partially reconstructed in which a distinct but small concha was present, often associated with an ear canal and normal drum membrane.

CONCLUSIONS

Reconstruction of an auricle should be undertaken with caution *but not with excessive skepticism*. Perhaps the postoperative results are somewhat similar to those obtained from repair of complete bilateral harelip as regards the wide nostrils, short columella and flattened nasal tip. The constructed auricles, in most instances, also show obvious deficiencies in fine structure, but who will deny that both procedures are justified if the patient with an auricular deformity and the child with bilateral harelip are benefited in their integration and self-assurance?

There is a tendency for experienced and critical plastic surgeons to become discouraged by the numerous compromises necessary in total ear construction. These men are sometimes influenced to give up the use of relatively dependable autogenous cartilage as a supporting framework and utilize some form of inorganic material that can be accurately shaped before burial. Unfortunately, these foreign materials immediately beneath the skin appear to elicit more host reaction than do similar foreign transplants in the orbit, or those more deeply implanted as substitutes for absent segments of blood vessels. There are no long-term reports of satisfactory auricles in which inorganic materials were used for the framework.

This is not to state that experimental work with foreign implants should not be continued. More precise knowledge concerning the rejection of homogenous and

heterogenous cartilage grafts and successful means to prevent this host reaction may be applied to the rejection of inorganic implants. Until this time arrives, however, the plastic surgeon should continue to use autogenous supporting tissue for reconstructing auricles, especially in children, who have a long life expectancy. Homogenous cartilage may be used for older patients when it is not deemed advisable to remove the costal cartilage, but the use of heterogenous cartilage from the ox or the sting ray is still in the realm of experimental surgery. When diced cartilage is used, a mixture of autogenous and homogenous shavings may actually be desirable, because gradual absorption of the homogenous cartilage tends to thin out the structure of the ear to some extent.

The possibility of removing the chondrocytes from cartilage and utilizing the matrix as a sort of "ideal homograft or heterograft" material without antigen qualities is fascinating but illusive. Attempts to synthesize a cartilage matrix or to inject substances that cause the host tissues to form cartilage have not been successful.

Workers in our Clinic are currently attempting to separate the chondrocytes from the matrix by a different approach, and this may eventually be accomplished. Homogenous and even heterogenous cartilage matrix without cells might provide a valuable grafting material, assuming that the foreign cells rather than the matrix are the antigens that cause the production of hostile antibodies.

SCHLUSSFOLGERUNGEN

Die Wiederherstellung des äusseren Ohres soll mit Vorsicht *aber ohne übertriebenen Skeptizismus* unternommen werden. Die Operationsergebnisse lassen sich vielleicht mit denen vergleichen, die man bei der Wiederherstellung einer voll-

the spleen Extensive arterial and venous thrombosis was present but the vessel walls were normal Both patients died from eclampsia and it is possible that the angio-spasm which perhaps occurs in this condition produced the thrombosis which resulted in necrosis The absence of vascular change precludes the inclusion of these cases in the first group and Lubarsch has placed them in what he calls the *toxic-thrombotic* group

Cases reported by Wilton (1925), Enzer (1926) and Lubarsch and case 1 recorded here form yet a third group In the cases described by Wilton and Enzer multiple areas of necrosis occurred in the spleen, mainly in relation to the malpighian bodies, in a case of influenza and a case of untreated pernicious anæmia respectively In both these cases the condition appears to be an exaggeration of the microscopic areas of focal necrosis which occur in acute infections In Lubarsch's case extensive infarct-like areas of necrosis occurred in the spleen of a man with pernicious anæmia who collapsed, and later died, following a blood transfusion In none of these cases was any abnormality found in the blood vessels of the spleen, and thrombosis was also absent It is of interest to note that Lemke (1925) has recorded necrotic changes in the liver and kidneys, after blood transfusions, similar to those which were present in Lubarsch's case The absence of vascular disease and of thrombosis in the splenic vessels in these cases therefore places them in a third or *toxic* group

No description of a spleen similar to that recorded in case 2 can be found in the literature In polyarteritis nodosa acuta extensive necrosis of the spleen is uncommon As a rule only one or two infarcts are present Reasons have already been given why the vascular lesions present in this case are not regarded as those of polyarteritis nodosa and so it appears that this spleen will have to go into a group of its own—the *arteritic* group

From a survey of the literature it is apparent that multiple necrosis of the spleen can be divided, ætiologically and pathologically, into four groups The spleens in each of these groups are closely similar macroscopically and their appearance justifies the name of speckled spleen given to them by Feitis

CONCLUSIONS

- 1 Two cases of multiple necrosis of the spleen are described
- 2 The literature is surveyed and an ætiological classification the condition into four groups, (i) arteriosclerotic-toxic-ombotic, (ii) toxic-thrombotic, (iii) toxic and (iv) arteritic, is csted

انصاف Thank Professor L J Witts and Dr A E Gow for permission notes of the two cases described

Fractures of the Upper and Lower Jaws

G. KENNETH LEWIS, M.D., F.A.C.S.*

CHICAGO, ILLINOIS

FRACTURES of the maxillofacial region are significant because of their proximity to the base of the skull, orbit, maxillary sinus and nasal fossa. It is important that these fractures be treated properly at the time of injury or as soon thereafter as possible. Undue delay, until bones have undergone ossification in faulty relations, will tend to cause malocclusion and disfigurement. In such a case correction at a later date is accomplished only by means of tedious and multiple operations, and deformity may result which subsequent surgical measures will be unable to correct satisfactorily.

This paper is confined to a discussion of reduction, immobilization and fixation of fractures of the bony tissues of the upper and lower jaws, and various methods of treatment in modern use. Such important aspects as etiology, diagnosis, symptoms and characteristics, soft tissue injuries and their treatment, and the whole subject of bone grafting and definitive reconstruction of the jaw will be discussed in subsequent articles.

Early care of fractures of the upper and lower jaws calls first for an immediate appraisal of the patient's general condition; the first concern is control of hemorrhage and shock. Until shock has been relieved, or when evidence of cerebral damage exists or is suspected, reduction and fixation should be postponed until the patient's con-

dition has been evaluated. During this waiting period the fractured jaw or jaws should be immobilized with some form of emergency bandage. The only exception to postponement is control of concurrent massive bleeding.

Next, the fragments should be immobilized and placed in such apposition that when they are united the anatomic norm and full function, or at least the best possible have been restored. The basic principle is the same for both superior and inferior maxillary fractures, i.e., fixation of the dental arches in normal occlusion.

A large proportion of facial fractures are compound and may be infected, but the infection is superficial, and body immunity will usually care for it. With certain fractures, drainage may become necessary as a precautionary measure.

Methods and Devices for Reduction.—The appliances and methods in general use today for immobilization and fixation of the fractured jaws are varied and numerous. Mention of the more important of these devices and observations on the technique of their application follow.

Intermaxillary wiring is a satisfactory and simple procedure for fixation, doing away with the discomfort incident to the taking of impressions and the fitting of splints. Its use, however, is dependent upon the presence of a sufficient number of good teeth in the upper and lower jaws for anchorage. It requires no complicated apparatus, and the application of wires is simple and rapid. The teeth are in full view throughout the procedure, and occlusion can be constantly observed.

Should the wires become loosened, they

*Clinical Associate Professor of Otolaryngology, University of Illinois College of Medicine, Attending Plastic Surgeon, Cook County Hospital and Illinois Central Hospital, Chicago; Consulting Plastic Surgeon, Illinois Central Railroad; Surgical Consultant, United States Fifth Army.
Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1950.
Submitted for publication Oct. 1, 1950.

may be broken off and their roots fractured. The crowns of the teeth may be fractured at the level of the gingival margins, or forced out of their sockets; the alveolar bone may be comminuted and the affected teeth devitalized. Badly damaged teeth should be removed, and any sequestrum of the alveolar process completely detached from the periosteum should be eliminated. Because of its good blood supply, alveolar bone has an excellent chance to survive if not detached.

The most difficult displacement is that in which the alveolus has been driven and impacted into the maxillary antrum. If this is irreducible, surgical intervention is indicated (Fig. 2).

When the alveolus is not displaced, it is sufficient to fix the fragment with buccal arch bars, immobilizing it for thirty days. This fixation can be applied to fractures of either the upper or the lower jaw. When the line of fracture assumes a horizontal

course and involves only the alveolar process, treatment is chosen according to relation of the line of fracture to the roots of the teeth. If the fracture passes across the occlusal or incisinal half of the roots, no treatment is required and teeth may be retained.

Horizontal Maxillary Fracture: In case of complete transverse fracture there is separation of the lower maxillary fragment from the rest of the maxilla. Displacement of the fragments may be downward, and because of looseness of fragments the teeth may be in poor occlusion. Lateral and posterior displacement, with disturbance of occlusion, is uncommon. Impacted fragments may be encountered. Upward displacement is usually observed in the impacted fragment.

When the fragment is displaced downward the maxilla is generally loose, palpation and manipulation will dem-

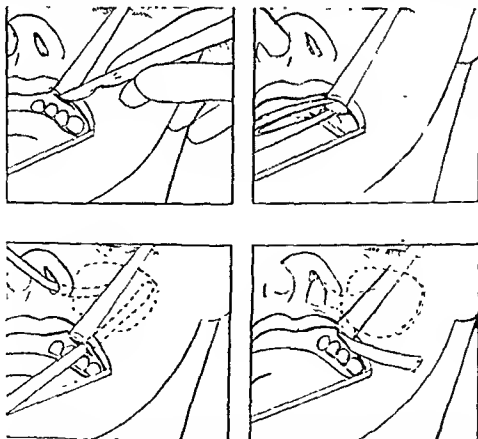


Fig. 5.—Caldwell-Luc opening and packing of antrum with iodoform gauze, bringing gauze out either through oral opening or through an inferior opening in nose. (Reproduced by permission of the Illinois State Medical Journal.)

than man known to suffer from the condition naturally. This fact is of importance, in view of the obstacles which prevent direct knowledge of the ætiology of benign enlargement in man, since it provides an opportunity of comparing the histology of the naturally occurring with that of the experimental enlargement. The present paper is concerned with this question in general, and in particular with an extraordinary specimen of enlarged prostate in a terrier. This had been preserved by Dr J R Baker, who handed it to us for investigation.* We wish to take this opportunity of expressing our indebtedness to him. That it has been possible to institute a comparison between this specimen and the experimentally enlarged canine prostate is due to the generosity of Professor S E de Jongh and his colleagues of Leyden, who placed at our disposal histological material from dogs they had injected with œstrone (de Jongh and Kok, 1935). To them also we wish to express our warmest thanks.

The size of the normal canine prostate

According to Kracht-Paléjeff (1910-11), the author of the only adequate account of pathological enlargement of the prostate in the dog that we have been able to find in the literature, the normal gland ranges in size between a pea and a walnut, depending on age and breed. The transverse and dorso-ventral diameters of a complete section of an "enlarged" prostate kindly loaned to us by the director of the institute of pathology, Royal Veterinary College, London, are 24 and 16 mm, respectively. Only one of the nine prostates we collected (dog 2) has smaller dimensions, the corresponding measurements being 11 and 8 mm, and as spermatogenesis was in progress in this animal at the time of its death, we may conclude that it was mature. In view of the dimensions of this specimen, and of Kracht-Paléjeff's description, it may be assumed that with the exception of dog 2, all our specimens are "enlarged" prostates (table I). The condition is widely stated to be common in dogs, although, as it rarely causes any urinary disturbance, it is seldom recognised except at autopsy. Kracht-Paléjeff states that it begins usually after the fourth year of life and that the organ often grows to the size of an apple. He refers to one case recorded in the literature in which the prostate of an animal of 25½ lb weighed no less than 10 lb.

Whether or not the canine prostate enlarges gradually throughout life has yet to be determined, we know of no detailed data on the "normal" size at different ages. If it does so enlarge—and the fact that all the prostates we collected were larger than the supposed

* A note on the histological correspondence between this specimen and the experimentally enlarged prostate was published in *Nature* on 20th June (Zuckerman, 1936b).

ization for twenty-eight to thirty-five days is usually required.

Unilateral fractures with considerable displacement can, as a rule, be reduced by a lateral pull applied to an arch bar attached to the loose fragment. On lateral displacement the loose fragment will be displaced downward, resulting in an open bite. This may be corrected by some form of intermaxillary wiring. The most satisfactory results are obtained by placing a buccal arch bar on the lower teeth (Fig. 6) and applying elastic traction between the upper and lower teeth, correcting the downward displacement. When the loose fragment has been replaced for a day or two, the elastic bands are applied between the upper and the lower jaw and held in place for four to five weeks.

Old Depressed Fracture of the Zygomaticus: Displaced fractures of the zygomaticus with impingement on the coronoid process of the mandible are frequent. They are easily overlooked for a time after injury because of excessive swelling and ecchymosis of the overlying soft tissues. Such a fracture can be reduced soon after

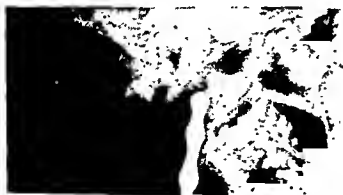


Fig. 10.—Comminuted fracture of ramus reduced with Lane plate, internal wiring and multiple loop intermaxillary elastic traction.



Fig. 11.—Hullihen splint used to control posterior fragment.

the injury; if it is not, conspicuous flattening of the cheek and restriction of motion of the mandible ensue.

Spontaneous healing of this type of fracture, with fixation of fragments, occurs within two weeks. Reduction, therefore, should be instituted early. Failure to reduce such a fracture, which obstructs the excursion of the mandible by impingement of the coronoid process against the depressed zygomaticus, results in permanent inability to open the mouth. Refracturing of the depressed zygomaticus and attempted repositioning usually accomplishes little.

In a former publication¹¹ I described a method of approach, i.e., to accept the depression as it has solidified and restore the facial contour either with rib cartilage or with cancellous bone. (This also I have previously discussed.¹²) In a series of patients, coroniodectomy successfully accomplished immediate release of the mandible with no further difficulty.

Edentulous Upper Jaws: These present a problem in fixation. Slight displacement of the upper jaw is unimportant and merely calls for a new denture. In fractures of the bones of the middle third of

prostate, which was enormously enlarged, and imperfectly divided into two larger cranial and two smaller caudal lobes. Before fixation the organ must have been at least 8 cm in transverse and 6 cm in crano caudal and ventro-

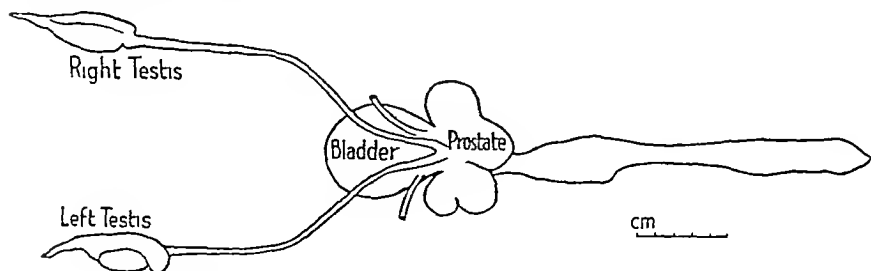


FIG 2—Dorsal view of genital tract of dog 1 $\times 0.24$

dorsal diameters. For purposes of histological examination, it was divided into a number of marked blocks, each of which was cut at 10μ . Serial sections were made of the two blocks which included the crista urethralis and the openings of the ejaculatory ducts, and every fifth section was mounted. Pieces of the membranous and penile urethra were also cut and stained. Fixation of the prostate was moderately good.

The interior of the prostate comprised a mass of cysts of varying size, most of which were filled with a solid core. Some of the larger were about the size of a normal canine prostate, and several exuded pus.

Dog 2 was a normal mature animal of undefinable breed. Its prostate, which measured 11×8 mm (table I), was cut serially at 10μ . Selected regions of the urethra and a block of the testis were also cut and stained.

Dog 3 was an aged Pekinese, with no history of urinary disturbance. The prostate, which measured 26×20 mm (table I), was divided transversely into five equal sized blocks and sections were cut at 10μ from the cranial surface of each. Sections of urethra and testis were also prepared.

Dog 4 was a fully mature and healthy mongrel terrier. The prostate, which measured $35 \times 29 \times 25$ mm (table I), was divided transversely into five equal sized blocks and sections were cut from each. Pieces of urethra and testis were also cut.

Dog 5 was a fully mature mongrel resembling a spaniel. The prostate measured $30.5 \times 32 \times 31$ mm. Preparations were made as in the previous specimen. The cut surfaces of the prostate revealed numerous small cysts. The bladder was considerably distended, but no obvious mechanical obstruction to the flow of urine was encountered.

Dog 6 was a fourteen year old greyhound. The prostate measured $46 \times 38 \times 41$ mm (table I). Its surface was somewhat nodulated. On account of its size, a few selected blocks only were cut.

Dog 7 was a mongrel, in appearance somewhat like a chow. The prostate measured $27 \times 24 \times 28$ mm (table I). Preparations similar to those of dog 4 were made.

Dog 8 was a wire haired fox terrier aged twelve years. The prostate measured $28 \times 21 \times 24$ mm (table I). The usual sections were prepared.

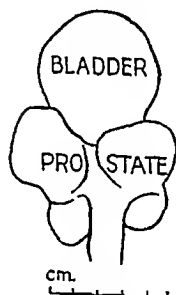


FIG 3—Ventral view of prostate and bladder of dog 1 $\times 0.34$



Fig. 16.—A and B, circumferential wiring used when teeth are either absent, too few or too insecure to afford attachment for wires, or when angle of fracture is such that circumferential wiring will hold proximal and distal fragments together.

dyles, according to Burket.¹⁶ The prognosis is guarded when this accident occurs, because bony ankylosis nearly always follows, necessitating single or double condylectomy.

Fracture of the Coronoid: Fractures of the mandible in which the coronoid is separated from the ramus are infrequent. Reduction is rarely indicated, because, as a rule, there is little or no displacement of the body. The treatment is immobilization with intermaxillary wiring, with the teeth in occlusion, two to three weeks. If the mandible is edentulous, fixation is usually not indicated. It is only from compound fractures of the coronoid that trouble may be anticipated.

Fracture of the Ramus: The ramus of the mandible has strong muscle insertions on both sides, which usually prevent displacement and adequately control the edentulous fragment. The zygomatic arch is commonly associated with this particular

fracture, and motion may be limited on healing (Fig. 9).

Treatment of fracture of the ramus *per se* is most easily accomplished by bringing the teeth into occlusion and maintaining fixation with intermaxillary wiring for two to three weeks.

Fracture at the Angle: Displacements encountered here are caused by the attachments of the elevator muscles, which pull the posterior fragment forward, upward and inward. The fragment describes an arc around the temporomandibular joint, if not resisted by the anterior fragment in the line of fracture. Viewed from above, the angle of the line of fracture may be such as to preclude inward displacement (See Fig. 8). Fracture at the angle may present a combination of circumstances whereby it is prevented from inward displacement but can be displaced forward and outward. In comminuted fractures the anterior fragment will have no control of

no teeth present, the posterior fragment is displaced upward by the elevators and forward and inward by the rotators; the anterior fragment is depressed, and the midline of the mandible is diverted to the injured side. It is for this reason that the tooth in the posterior fragment is preserved, even though it may be in the line of fracture. A practical method of immobilization here is a modification of the technic of Lenormant and Darcissac, as previously credited to Fry and his co-workers. If bone loss is present, displacement forward is greater, and advantage may be taken of this to facilitate union, movement forward being prevented to the extent that contact is lost with the anterior fragment.

Fracture of the Body of the Mandible: If a sufficient number of teeth are present in the mandible and maxilla, they are held in occlusion with intermaxillary wiring. Displacement is slight, owing to action of the teeth, but if teeth are scarce and the injury severe great deformity occurs, depending on the line of fracture. When the fracture is vertical, the posterior fragment is displaced upward and the anterior fragment downward by the depressor muscles attached. The line of fracture is usually oblique, and the overlapping fragments tend to accentuate the displacement owing to the action of the external pterygoids.

If multiple fractures occur in the body, a typical deformity results. The middle fragment is generally displaced downward and backward and the two side fragments upward and toward the midline. The amount of displacement depends upon the obliquity of the lines of fracture. The backward displacement of the middle fragment may seriously interfere with respiration, and, owing to loss of control of the tongue, swallowing becomes difficult and the patient is unable to control the saliva, with resultant dribbling. Treatment may be accomplished by circumferential wiring,

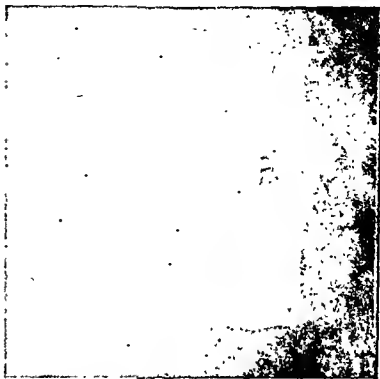


Fig. 17.—Comminuted fracture of body of mandible held in occlusion by intermaxillary wiring and buccal arch bar.

intermaxillary wiring, the use of buccal arch bars or other methods as indicated (Figs. 16 and 17).

Fracture of the Symphysis: This fracture may be single, multiple, or comminuted. Single fractures are, as a rule, vertical, lying either between the central and lateral incisors or the lateral incisor and the canine, and there is little displacement of the fragments (Fig. 18). Intermaxillary wiring is usually adequate for immobilization.

Multiple fractures with teeth present, if seen early, may also be immobilized by intermaxillary wiring. If the jaw is edentulous, circumferential wiring may be used over a splint or a denture. The Kirschner type wire technic, previously mentioned, is also ideally adaptable to these fractures.

Comminuted fractures of the symphysis, when seen early, can be maintained in position by connecting the lower jaw to the upper with a buccal arch bar (Fig. 19). When seen late, this type of fracture is reduced by means of separate arch bars

In uncomplicated fractures, limitation of motion on removal of fixation disappears usually within seven to ten days on normal use of the mandible. On resumption of chewing, talking and exercise, normal function is rapidly restored except in cases of extensive gunshot injuries in the region of the ramus, when limitation of motion may result from the formation of cicatrices, true joint ankylosis being rare.

COMMENT

For fractures of the upper and lower jaws in children and infants, interdental wiring may be done with a light wire. Owing to the shape and instability of the teeth in these patients, however, this wiring is usually difficult to control, and the application of a Roger Anderson splint or some form of dental splint cemented to the teeth will usually hold the fracture much better without jeopardizing the teeth of these youngsters. Fractures in infants are infrequent.

Many procedures, e.g., the application of wires, are better performed without anesthesia. Anesthetics are indicated, however, for operations upon the fracture areas when force may be applied. Local anesthesia is not used in the reduction of facial fractures if the surgeon is thereby hindered in the performance of the operation. Intravenous and rectal anesthetic agents are also avoided. Inhalation endotracheal induction is the simplest method, since the equipment used for it is the least complicated and by its use an adequate airway is maintained. The endotracheal tube, with complete occlusion of the pharynx, represents the maximum of safety for the patient and convenience for the surgeon. It enables the anesthetist and his apparatus to be well away from the field of operation.

In the repair of mandibular fractures particularly, general anesthesia is avoided

whenever possible, especially when the upper and lower jaws are to be wired together. This is because postanesthetic vomiting may cause asphyxia during recovery from anesthesia and is likely to loosen or break the wires. For this reason and because of the strain placed upon the fixation and the teeth during the waking period, block or infiltration anesthesia is preferred and has been found sufficient in most mandibular fractures. When a general anesthetic is employed, the wiring is performed during the period of anesthesia. For repair of fractures of the zygomaticus, general anesthesia is the rule.

In operations upon the jaws, a short McGill tube is passed through the nose until the patient is completely awake, to insure an adequate postoperative airway. As an added precaution the patient is turned on the side or abdomen, with the head turned, in order that any drainage may run from the mouth by gravity, rather than depend upon suction to clear the throat of any blood or debris.

During the treatment of jaw fractures it is not necessary to remove the teeth in order to feed the patient. Many patients already have one or more teeth missing, or there is usually some space behind the last molars. The use of the stomach tube passed through the nose would be preferable to the removal of sound front teeth, but this is seldom necessary except temporarily and in cases of extremely severe injury.

It is essential that a patient with a fractured jaw or jaws receives sufficient caloric intake to maintain his weight and physical strength. He should be able to assimilate foods similar to those consumed prior to the accident, by pregrinding and massaging between the teeth. A well-balanced diet should be given and the patient encouraged to eat. Vitamins, when indicated, may be given for supplementation.

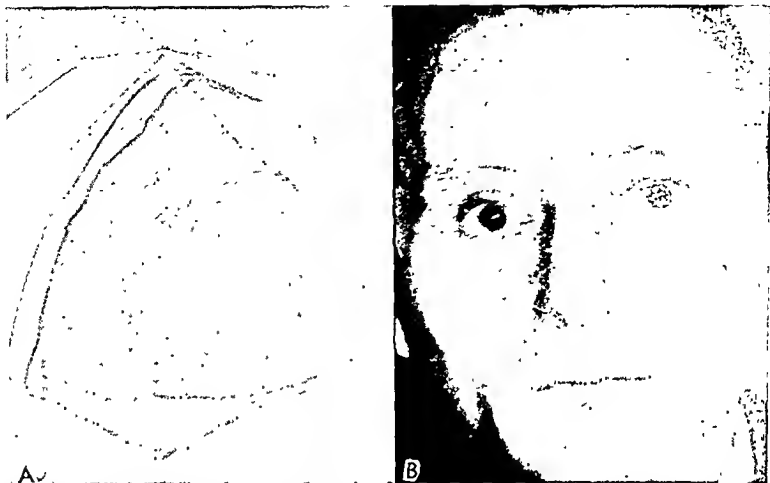


Fig. 1.—A, extensive defect of frontal region following radical resection of frontal bone for chronic osteomyelitis thirty years earlier. In recent years preserved cartilage has been inserted on several occasions, only to become absorbed. B, patient one year after reconstruction with autogenous bone graft.

In recent years we have encountered a series of cases of extensive defects of the scalp and cranium.

REPORT OF CASES

CASE 1.—H. P., a 50-year-old man, illustrates the absorption of preserved cartilage graft and later permanent correction with autogenous iliac bone. Thirty years ago this patient underwent a radical resection of the frontal bone for osteomyelitis. On several occasions thereafter preserved cartilage was inserted, only to become absorbed. A severe paresthesia developed along the distribution of the right supratrochlear nerve, with a trigger area in the scar. Figure 1A shows the extensive irregular defect in the area of the frontal sinus. The defect was exposed through a coronal incision and all of the scar was removed. A block of iliac bone was then removed and carved to fit into the defect, reconstructing the entire forehead and glabellar area. Figure 2 shows the same patient one year

after the reconstruction. The paresthesia has been completely relieved.

CASE 2.—T. C., a 6-year-old boy, was struck by a steam roller, which caused a crushing injury to the left frontal and temporal regions and the middle third of the face (Fig. 2A). Pneumatocele developed after the original injury, and the reconstruction work had to be delayed. A left dacryocystorhinostomy was first performed, followed by reconstruction of the floor of the right orbit and middle third of the face with autogenous cartilage (Fig. 2B). Moulages made in succeeding years indicate the continuous growth of the grafts over a period of four years (Fig. 2C).*

CASE 3.—The case of A. R., a 33-year-old man, illustrates correction of multiple defects with autogenous cartilage grafts. A. R. had sustained a crushing defect of the left side of the forehead and the left temporal and orbital regions, with depression of the malar

*Other cases in which autogenous bone and cartilage were used, followed for six to eight years, have revealed evidence of continuous growth of the graft as long as the curve of motion of growth was in the

The ejaculatory ducts (vasa deferentia) comprise a central duct with numerous simple tubular glandular offshoots, the whole system being lined by columnar epithelium, and both offshoots and ducts containing numerous spermatozoa. The ducts enter the urethra about 1 mm above the opening of the uterus masculinus. The latter is a sagittally disposed simple diverticulum with a narrow lumen (fig 5). It is approximately 1.5 mm long and is lined with a low, somewhat irregular epithelium. The utricular stroma is differentiated from the surrounding fibro-muscular tissue by being slightly more chromophilic.

The oestrone-stimulated prostate (de Jongh and Kok's specimens)

The essential changes induced in the prostate of the dog by oestrone are, as in the mouse and monkey, fibro-muscular overgrowth and epithelial hyperplasia. The increase in fibro-muscular tissue is relatively more conspicuous in those specimens in which epithelial changes are least pronounced.

Changes occur in all the epithelial elements of the prostate except the ejaculatory ducts—urethral epithelium, collecting tubules, glandular acini and uterus masculinus. The available specimens unfortunately do not allow a definite decision about the ejaculatory ducts, but in so far as any conclusion is permitted, it would appear that they do not share in the general changes.

The glands of the dorsal half of the prostate are more sensitive than those ventral to the urethra (fig 6) and, as in the mouse (Burrows, 1935), the proximal parts of the collecting tubules react sooner than the parts situated more peripherally. The essential changes appear to be, as Burrows has described for the mouse, (a) arrest of secretion, (b) epithelial hyperplasia and (c) epithelial metaplasia, the last two processes grading into each other and converting the once single layer of columnar cells into a heavily stratified and rapidly desquamating epithelium. The epithelium is no more than two or three layers thick in the most rapidly growing acini, the more superficial cells being immediately shed (fig 13). By this process of growth the glandular system is converted into a series of cysts filled with a core of shed epithelial cells and separated from each other by fibrous trabeculae covered on each side by flattened epithelial cells (fig 11).

The change in the utricular epithelium is essentially similar and indeed it is impossible in some sections to distinguish this diverticulum from other affected glands except by its topography (fig 9). In one specimen the utriculus extended upwards for a considerable distance behind the ejaculatory ducts. As a rule, too, the epithelial proliferation occurring in the region of the utricular mouth extends irregularly into the stroma of the crista urethralis,

stead, within a year there was definite roentgen evidence of osteogenesis extending from the edges of the skull defect to the rib grafts and between the grafts themselves. The rib grafts were removed first from the left side of the chest and then from the right. On subsequent removal of the third and fourth grafts, the resected rib had regenerated so that it was difficult to tell it from its normal neighbor. Clinically, at the time of writing, the large defect is reconstructed with solid bone. It is not sensitive, nor is there any evidence of fluid or edema. The child (Fig. 6B) has not worn any protective dressing since one month after the last bone graft was inserted. He speaks and plays normally with his brothers and sisters.

SUMMARY

The authors present their experience with a large series of cases in which autogenous bone and cartilage grafts were employed in the treatment of extensive defects of the scalp and skull. They are impressed with the lasting qualities of such material in contrast to those of homologous grafts. Five illustrative cases are reported.

RESUMEN

Los autores presentan su experiencia con una gran serie de casos en los cuales se emplearon injertos autógenos de hueso y cartilago en el tratamiento de extensos defectos del cráneo. Ellos estan impresionados con las cualidades duraderas de ese material en contraste con las de los injertos homólogos. Se reportan cinco casos ilustrativos.

ZUSAMMENFASSUNG

Die Verfasser berichten über ihre Erfahrungen mit körpereigenen Knochen- und Knorpeltransplantaten in der Behand-

lung einer langen Reihe von Fällen mit umfangreichen Defekten der Kopfhaut und des knöchernen Schädels. Sie sind von den dauerhaften guten Eigenschaften dieses Materials im Gegensatz zu denen homologer Transplantate beeindruckt. Sie berichten über fünf erläuternde Krankheitsfälle.

RÉSUMÉ

Les auteurs présentent le résultat de leur expérience en s'appuyant sur une grande série de cas dans lesquels ils ont utilisé des greffes d'os et de cartilage autogènes pour le traitement de lésions étendues du cuir chevelu et du crâne. Ils ont été impressionnés par les qualités durables d'un matériel comparé aux greffes homologues. Cinq cas typiques sont rapportés.

RIASSUNTO

Gli autori comunicano la loro esperienza su trapianti autogeni di osso e di cartilagine, che essi hanno utilizzato in un gran numero di casi per riparare vaste perdite di sostanza del cranio e del cuoio capelluto. La loro impressione è che questi materiali abbiano qualità superiori, a quelli omologhi.

Riferiscono 5 casi dimostrativi.

REFERENCES

1. Pudenz, R. H., and Odom, G. L.: *Surgery* 12: 318-344, 1942.
2. Elkin and Holbrook: Cited by White, J. C., *Ann. Surg.* 128:743, 1948.
3. Lane, S., and Webster, J. E.: *J. Neurosurgery* 4:526, 1947.
4. Scott, M., and Wycis, W. T.: *J. Neurosurgery* 3:310, 1946.
5. Delangeniere, Y.: *Surg., Gynec. & Obst.* 30: 441-447, 1920.
6. Grant, T. C., and Norcross, N. C.: *Ann. Surg.* 110:488-512, 1939.
7. Woolf, S. I., and Walker, A. E.: *Cranioplasty, Collective Review, Internat. Abstracts Surg.* 81: 1-23, 1945.

cystic development, the uterus masculinus cannot be recognised as such except within the crista urethralis, in which it runs a course of some 2 mm (fig 10) The epithelium of the diverticulum is heavily stratified, and near its mouth there is considerable proliferation of its basal layers into the stroma of the crista—a condition identical with that seen in the experimental specimens Surprisingly few of the cysts show round-celled infiltration Where it occurs it is presumably a secondary phenomenon similar to that seen in experimentally enlarged prostates

The epithelium of the prostatic urethra in this specimen is even more stratified than that in the experimental prostates (figs 9 and 10) The stratification extends distally to the external urethral opening and proximally well above the mouths of the ejaculatory ducts Its upper limit cannot be determined owing to post-mortem shedding of the epithelium In its distal extension the stratification is highly reminiscent of the condition met with in certain species of monkey after oestrogenic stimulation (Zuckerman, 1936b)

Over the lower half of the crista urethralis the epithelium had proliferated deeply into the stroma, forming extensive irregular blocks of stratified epithelial cells easily visible to the naked eye in section Within these masses of cells numerous simple gland-like structures can be seen, each consisting of a circle of epithelial cells without any definite central lumen These structures are fairly regularly disposed and, in spite of a superficial resemblance can readily be differentiated from the cell-nests of malignant squamous growths by the uniformity of the single layer of cells of which they are formed The metaplastic cysts of the prostate proper also display a superficial resemblance to certain other cellular formations seen in malignant epitheliomatous tumours

The enlarged prostates of dogs 3-9 (table I)

The histology of these specimens, which appeared obviously enlarged, is very different from that of dog 1 The glandular epithelium is, almost without exception, normal, but more actively secretory than usual, and comprises a single layer of large columnar cells in all the regions examined (fig 8) The acini are, however, very irregular in shape and variable in size, some forming relatively voluminous cysts filled with secretion (fig 15) The glandular cells are larger and their inner borders less clearly defined than in dog 2, the "normal" specimen (fig 7)

A few cysts lined by a low, single-layered epithelium are present in the prostates of both dogs 3 and 4, the size of these cysts is surprising in view of the apparently non-secretory nature of their epithelium A very few glands are also lined by a low stratified

RÉSUMÉ

Une techniques de résection de l'excédent de peau et de tissus sous-cutanés des cuisses est décrite, s'ajoutant à celles en usage pour l'abdomen, les seins, la face et le cou, appliquées aux malades ayant subi une perte de poids importante. Son expérience quoique limitée de cette technique —conçue afin de résoudre un problème spécifique— a permis à l'auteur d'obtenir des résultats satisfaisants. Il est convaincu de pouvoir à l'avenir procéder sans danger à des excisions plus étendues, obtenant ainsi une cicatrice plus souple et augmentant l'élévation des tissus relâchés et ptosés. Le confort du malade ne devrait pas être négligé, et le port seyant de ses vêtements n'est pas un facteur mineur; cependant la confiance en soi retrouvée et l'état psychologique post-opératoire ont plus d'importance que ces autres facteurs.

RIASSUNTO

Viene descritta una tecnica per ridurre l'eccesso di cute alle anche; questa tecnica deve essere affiancata a quella in uso per ridurre la sovrabbondanza di cute e sottocutaneo dell'addome, delle mammelle, del viso e del collo, allo scopo di migliorare l'aspetto delle persone che abbiano avuto una forte perdita di peso.

L'esperienza dell'autore, benché limitata, è stata soddisfacente; egli è persuaso che in avvenire si potranno escidere con sicurezza tratti molto più ampi di cute e di sottocutaneo così da ottenere una migliore sistemazione dei tessuti ptosici e rilassati.

RESUMEN

Se describe una técnica, para reducción de la piel y tejido celular subcutáneo redundantes en los muslos, para agregarse al armamentarium quirúrgico para la re-

ducción de la piel y tejido celular subcutáneo redundantes en el abdomen, el pecho la cara y el cuello para mejorar la comodidad y la apariencia de pacientes que han perdido excesivo peso. La limitada experiencia del autor con esta operación que ha sido creada para resolver un problema específico ha sido satisfactoria. El está convencido de que en el futuro él puede extirpar sin riesgo piel y tejido celular subcutáneo mas generosamente, obteniendo así un cierre más ajustado y mejorando la elevación de los tejidos relajados y caídos. La comodidad del paciente no debe menospreciarse, y la conveniencia en el ajuste de la ropa no es de menor importancia; sin embargo, el factor más importante es el mejoramiento de la condición psicológica del paciente y su confianza en sí mismo después de la operación.

ZUSAMMENFASSUNG

Dem Chirurgen, der zur Besserung des Wohlbefindens und der äusseren Erscheinung von Kranken mit erheblichem Gewichtsverlust durch Entfernung überflüssiger Haut und überflüssigen Unterhautzellgewebes am Bauch, an den Brüsten, am Gesicht und am Hals beiträgt, wird durch die Beschreibung einer Technik zur Resektion überflüssigen Haut- und Unterhautgewebes am Oberschenkel eine weitere Möglichkeit auf diesem Felde geboten. Die begrenzten Erfahrungen des Verfassers mit dieser Operation, die mit dem Ziel der Lösung eines bestimmten Problems ausgearbeitet worden ist, sind zufriedenstellend. Er ist überzeugt, dass er in Zukunft ohne Gefahr umfangreichere Resektionen der Haut und des Unterhautzellgewebes ausführen und somit einen strafferen Verschluss und eine bessere Hebung des ptotischen und erschlafften Gewebes erzielen kann. Das Wohlbefinden des Kranken und die ihm gebotene Möglichkeit, in seine Kleider zu **passen**, sind

Grindlay and his associates,⁵ as early as 1951, reported on the properties and tissue response of formalinized polyvinyl alcohol sponge (Ivalon). Since then, Mortensen and Grindlay⁶ and Shumway and his associates⁷ have reported a favorable experience in the substitution for major arteries, both experimentally and clinically, of tubes made of molded compressed Ivalon sponge. Gross and histologic observations have revealed a fate for these materials similar to that of homografts.⁶

Using a method similar to that of Shumway, Gliedman and Lewis,⁷ we have constructed Ivalon arterial prostheses, and on the basis of our experience with these in dogs and patients, consider them satisfactory arterial substitutes. In fact, we prefer them to homografts for replacement of arteries the size of the common femoral or larger.

Method of Construction of Ivalon Tubes.

—The remarkable physiochemical properties of Ivalon must be known for the proper construction of arterial grafts. The material is supplied in block sponge form, which is soft and pliable and is kept so by a hygroscopic agent. Formaldehyde is also present to inhibit bacterial growth. This raw product must be washed thoroughly under running water for twenty-four hours, or a severe foreign body reaction will be evoked by the retained formaldehyde (Fig. 1).

After washing, the large block must dry thoroughly to allow cutting. Five days should be allowed for complete drying. By means of a large band saw, the block is cut into sheets varying from 1.5 to 3.5 mm. in thickness.

To form the graft, the sheets are soaked in cool tap water. They become flexible, elastic, spongy and hydrophilic.

Our compression molds are of stainless steel with brass cores (Fig. 2A). They are precision-machined to provide uniform luminal diameter and wall thickness.

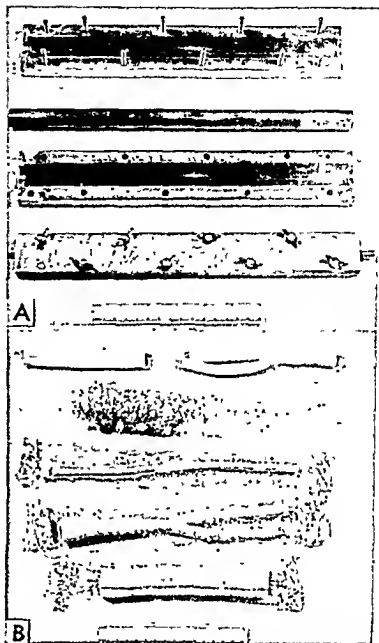


Fig. 2—A, stainless steel molds with brass core. B, method of storing finished molded grafts in sterile cellophane bags.

While moderately stretched, the wet sheets are rolled upon the brass core approximately three times, providing a wet, uncompressed thickness of 9 to 12 mm. The wet, spongy roll is compressed in the mold and autoclaved for twenty minutes. It is usually necessary to retighten the wing nuts once during this sterilization.

After compression to a final thickness of 1.5 to 2 mm., a sixfold increase in density is achieved. The mold is cooled; the graft is removed and trimmed and is ready for use.

In our opinion the final density is of the utmost importance in determining the

inized Sponge: Their Use as Replacements for Segments of Aorta and Major Arteries, Arch. Surg. 72:871, 1956.

7. Shumway, N. E.; Gliedman, M. L., and Lewis, F. J.: An Experimental Study of the Use

of Polyvinyl Sponge for Aortic Grafts, Surg., Gynec. & Obst. 100:703, 1955.

8. Brown, J. B.: Discussion of Paper of Mortensen, J. D., and J. H. Grindlay, Arch. Surg. 72: 871, 1956.

IMPORTANT NOTICE TO ALL CONGRESS PARTICIPANTS

Those desiring their Congress presentations to appear later as articles in the Journal of the International College of Surgeons, please note:

1. A full copy of the manuscript, together with all illustrations, legends, tabular matter and bibliographic references, should be sent DIRECT to the Editorial Office, Journal of the International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois. Manuscripts so submitted will be promptly acknowledged and, on acceptance by the Editorial Board, published as soon after the Congress as possible. The Journal cannot be held responsible for loss, failure of acknowledgment, delay in publication or nonpublication of any manuscript, or any subsidiary material appertaining thereto, which has not been submitted through the official editorial channels.

2. Manuscripts may be submitted in advance of the Congress if desired. When this is done, they should be plainly marked with the name, place and date of the Congress concerned, to guard against premature publication.

3. Manuscripts delivered in person to Congress officials or others for press reportorial use only should be sent by the recipient to the Public Relations Bureau.

These requests are made not only to safeguard the Journal from error but in the best interests of our contributors. To make sure of prompt acknowledgment and efficient handling of your Congress presentation, please send it DIRECT to its ultimate destination!

Plastic Surgical Management of Common Lesions of the Face and Oral Cavity

JAMES F. DOWD, M.D., F.A.C.S., F.I.C.S.

ST. LOUIS, MISSOURI

IN dealing with malignant lesions of the head and neck one encounters chiefly the basal cell and squamous types of epithelioma. Other conditions, such as malignant melanoma and the ever-present hemangioma, also must be considered.

From the point of view of the plastic surgeon or any other surgeon who undertakes the treatment of such lesions, the objectives are clearly defined: (1) complete removal of all diseased tissue and (2) adequate reconstruction of the resulting defect, so that the patient is socially acceptable and can carry on his gainful occupation. Surgeons are naturally interested in accomplishing these ends by surgical methods rather than by other forms of therapy, such as electrodesiccation, cautery destruction or irradiation.

If all diseased tissue has been successfully removed, final reconstruction can be carried out immediately rather than postponed for some future date. One must be absolutely certain, however, that all of the malignant growth has been removed. Several steps are useful in this direction: 1. Outlining the area of the tumor and of the proposed excision with a skin dye before the injection of a local anesthetic into the surrounding tissues results in distortion of the features, or before partial incisions are made in the area. 2. Conducting an immediate check of questionable

tissue by frozen section. This can give a clear idea of the progress of the tumor to the periphery and also to the depth of the excision. 3. Checking the results of routine pathologic examination against the frozen sections.

Once the diseased tissue has been removed, the surgeon's problem revolves around the satisfactory repair of the resulting defect to produce the second major aim aforementioned, namely, a reconstruction so satisfactory that the patient is socially acceptable and can carry on his work, so that he does not become a burden on his relatives or on some charitably supported organization. A number of procedures are commonly employed by the plastic surgeon to convert unsightly defects into satisfactory end results. It is the purpose of this paper to review briefly some of these methods and to demonstrate their application to various regions of the head and neck. They can be listed as follows: (1) direct closure; (2) extensive undermining with direct closure; (3) the use of local flaps; (4) the use of split thickness skin grafts; (5) the use of full thickness skin grafts; (6) the use of distant flaps; (7) the use of composite grafts, and (8) metallic reconstruction of the mandible after radical resection of the neck and jaw.

Let us first consider conditions involving the nose. Direct closure on the dorsum, where the skin is relatively limited, is rarely possible, and it is usually neces-

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.

Submitted for publication Jan. 11, 1957.

this kind is essentially not abnormal—unless hyperactivity be regarded as an abnormality—nor, as is usually stated, does the enlargement appear to cause obstruction to the flow of urine. If the normal activity of the prostate is under the control of male hormone, as is generally believed, it is conceivable that this kind of enlargement is due to an excess of male hormone, it may be noted in this connection, however, that there was no excess of interstitial tissue in any of the testes relating to this series of prostates. The possibility that the prostate of the dog is unusually sensitive to male hormone is readily amenable to experimental test.

In neither Kracht-Paléjeff's paper nor elsewhere in the literature have we found any reference to prostatic changes comparable with those manifested by the prostate of dog 1 of our series. As indicated above, these changes are identical with those experimentally induced by oestrogens (essentially comprising excessive and unceasing division of cells derived from the epithelium of the uro-genital sinus) since these changes are specific to oestrogens, it is reasonable to conclude that the spontaneous prostatic enlargement of dog 1 was a response to an oestrogenic agent elaborated within the animal's body. That the male mammal normally produces such a substance is well known, and the view which we advance merely implies that the changes in question were caused either by an absolute excess of oestrogen or by a relative excess following a diminution in the level of secretion of male hormone proper.

Other evidence of oestrogenic stimulation in this animal is provided by its enlarged nipples and by the stratification of its urethral epithelium. The swollen penile sheath may also be comparable with the corresponding swelling shown by rhesus monkeys when injected with oestrone. The view that the dog's "feminine" behaviour should also be taken as evidence pointing in the same direction is, however, not warranted, since oestrous behaviour has not been clearly shown experimentally to be a specific effect of oestrogenic substances.

The occurrence of epithelial hyperplasia and metaplasia throughout the whole of the prostate in question is of great interest from the point of view of the responses of the prostate of monkeys to oestrogenic stimulation. Reports on rhesus or other monkeys injected with oestrone for more than 89 days are not as yet available, in monkeys injected for shorter periods only the proximal parts of some of the collecting tubules are affected (Zuckerman and Parkes, 1935-36). In monkeys belonging to the genus *Cercopithecus* which had been injected for two weeks there was some mitotic activity of the epithelium of the prostatic glands proper, but no evidence of epithelial stratification and shedding. On the other hand the data provided by de Jongh and Kok for the dog

or indeed the entire ear, can be removed without difficulty. Prosthetic appliances made of latex and glued to the scalp in the mastoid region offer satisfactory camouflage. When smaller lesions are present, certain portions of the ear can be removed through elliptic incisions without producing any particular distortion of the ear. The use of full thickness skin grafts on the anterior aspect of the ear for lesions involving the underlying cartilage, when excision of all but the posterior skin of the ear is required, is a common and satisfactory procedure.

In dealing with the scalp, it is usually possible to close large defects with local flaps. This is particularly important in treating a woman or a man who still has a full head of hair. Hair-bearing scalp can be moved to cover large defects. The secondary defect created can be covered with split thickness skin grafts and the hair trained over the bald area produced by the skin grafts. The area of scalp thus moved can be considerable, and the coverage by hair can be quite satisfactory. Children have a tendency toward hemangiomas, some of which grow very rapidly and require extensive excision, even at an early age. The resulting defect can usually be closed without difficulty by proper undermining of the tissues adjacent to the defect. It is desirable in certain cases to make absolutely certain that undue tension is not placed upon the eyebrow, pulling it up out of position, or that the normal hairline is not distorted by being pulled over the forehead. When the patient is completely bald, the use of full thickness skin grafts on the scalp is entirely satisfactory.

In the cheek the tissues are quite lax, particularly in the elderly and aged, and, as age advances, the opportunity for use of large cheek flaps increases. Some of these cheek flaps can involve a major portion of the cheek, others only a partial

advancement. The use of the skin closest to the area of excision is always, of course, the most desirable, and it is only in rare cases, in which extensive and multiple lesions involve large areas of the cheek, that the split thickness skin graft is used. When partial or complete resurfacing of a cheek is necessary, however, the split thickness skin graft serves a useful purpose.

Parotid tumors present a number of problems known to all surgeons. These hinge around (1) complete removal of the tumor and (2) preservation of the facial nerve. Identification of the facial nerve by using the posterior facial vein as a landmark, as pointed out by Dr. Louis Byars, makes for adequate removal of the tumor without injury to the nerve in most cases. The size of the tumor can, on occasion, be considerable, but the same basic technic can produce a satisfactory result.

Lesions of the upper lip are relatively uncommon; they do appear at the base of the ala, in the fold between the lip and the cheek. These lend themselves to adequate excision with favorable reconstruction of the upper lip, and no major distortion is involved. The ordinary isolated lesion of the lower lip is well handled by a V type of excision. Apparently, if one follows the normal cutaneous folds, a more pleasing result can be obtained than when the excision is made in a completely vertical direction. For multiple lesions of the lip, or when the vermilion border of the lower lip is extensively involved by leukoplakia, the combination of a single or double V type of excision, plus complete excision of the vermilion border with advancement of the mucous membrane of the lower lip to reconstruct it, results in a satisfactory postoperative condition.

Operation on the tongue for areas of leukoplakia or early squamous cell carcinomas is perhaps acceptable. Operation for extensive lesions of the

REFERENCES

- | | | |
|-------------------------------|---------|--|
| BURROWS, H | 1935 | this <i>Journal</i> , xli 423 |
| VAN CAPPELLEN, D | 1930 | <i>Brit J Urol</i> , viii 45 |
| DE JONGH, S E | 1935 | <i>Arch internat Pharmacodyn</i> , l 348 |
| DE JONCH, S E, AND KOK, D J | 1935 | <i>Acta Brev neerl</i> , v 177 |
| HOBDAI, F T G | 1924 | Surgical diseases of the dog and cat, 3rd ed, London |
| KRACHT PALÉJEFF | 1910 11 | <i>Arch wiss prakt Tierheilk</i> , xxxvii 299 |
| ZUCKERMAN, S | 1930a | <i>Lancet</i> , i 135 |
| „ | 1930b | <i>Nature</i> , cxxxvii 1032 |
| ZUCKERMAN, S, AND PARKES, A S | 1935 36 | <i>J Anat</i> , lxx 323 |

ruditory hypospadias (Fig. 2A). The rudimentary penis, which was smaller than the normal clitoris, remained unaffected. The large breasts retrogressed well. The lips remained hairless, and the chin was almost bare except for a few hairs on either side. There was no hair on the chest and legs.

A moustache was constructed from the hairy skin of the scalp (Fig. 5). Phalloplasty was then performed.

Operative Technique: Reconstruction of the penis is carried out in many stages and usually requires about six to nine months.

First Stage. A large abdominal tube pedicle was constructed from the skin, subcutaneous tissue and fat (Fig. 2A). Two parallel curved incisions (for elevating the flap) were so planned that later, when the upper end of the pedicle should be severed and transplanted to the hand, it would not twist. Thick interrupted chromic catgut sutures were used to unite the fatty layer of the superficial fascia of the abdomen in converting the flap into a tube (a, Fig. 4). The tissue reaction of the catgut finally leads to the production of a strong ridge of fibrous tissue in the pedicle which makes it somewhat stiff (b, Fig. 4).

Second Stage. The lower end was severed and transplanted to the hand on the same side (Fig. 2). I like to avoid direct transplantation of the abdominal pedicle to the subsymphysal region, as this produces an undesirable twist of the pedicle.



Fig. 1.—So-called vagina and clitoris (rudimentary penis). Appearance after a few months of hormonal therapy, with some development of testes and scrotal sacs. Abdominal pedicle is covered with many-tailed bandage.

Before the connection of the tube pedicle was severed at any point it was conditioned for several days. A fine rubber tube was applied to the end of the pedicle to be severed for about ten minutes every three hours, and the time interval being made progressively longer and more frequent until, on the day before disconnection, the rubber tube was left tied to the tube pedicle for about twelve hours. Absence of change in color and of lowered temperature at any part of the pedicle were considered safety signs that disconnection will be safe.

Third Stage. The pedicle was disconnected from the abdomen. A triangular flap of skin was raised below the symphysis pubis, with its base towards the vagina.

The rudimentary clitoris-like penis was dissected, to be used as a central peg, and the tube pedicle was grafted over it and sutured to the subsymphysal region by interrupted stitches (Fig. 2B). This little penile stump under sexual impetus produces the elevation of the newly constructed phallus with its bony baculum (Fig. 2C).

Fourth Stage. A massive bone graft about 10-11 cm. long with a larger periosteal segment was obtained from the tibia (Fig. 5). On the upper part of the tibia, two 14 cm. parallel incisions were made 3 cm. apart. Both ends of the incisions were joined. The periosteum was elevated a little more than 0.5 cm. along the longitudinal incisions and at the lower end. More than 3 cm. of periosteum was elevated at the upper end. Fine drill holes were made 1 cm. apart to map out a bone graft about 10 cm. long and 1.5 cm. broad. With the help of osteotome and hammer this bone graft was elevated, together with the large segment of periosteum, which is kept attached to it. The ends of the bone graft were rounded off and a fine hole drilled at the long periosteal end.

Two short longitudinal incisions were made in the pedicle, at its proximal and its distal end. These incisions were connected by making a subcutaneous tunnel in the pedicle to receive the bone graft. The proximal incision also exposed the rudimentary clitoris-like penis peg.

A stout chromic catgut suture was passed through the hole in the bone at the long periosteal end of the bone graft and through the penile peg and was then tied. A few stitches sutured the flap of periosteum to the rudimentary penis. The bone graft was thus firmly anchored to the penile peg.

it was realised that a precipitin test gave good results with the few strains selected, this method was applied to a larger number of strains, all of which had been isolated from calves. The second part of the paper therefore deals with the application of the selected technique to these strains and with the results obtained.

PRELIMINARY STUDY OF MUTATION OF STRAINS OF *BACT COLI* ISOLATED FROM DISEASED CALVES AND ONE STRAIN OF *BACT* *AEROGENES*

The rapid mutation occurring with certain strains of *Bact coli* isolated from diseased calves has already been recorded by Smith and Bryant (1927) and the observations here described largely confirm their findings. Four strains of *Bact coli* (C 32, C 43, C 47 and C 73) isolated from calves and one strain of *Bact aerogenes* (D 29) from pyometritis of a dog, were selected for the preliminary study, all five strains showed this characteristic mutation.

Colony formation

Two types of colony of the calf strains appeared after 24 hours' growth on agar plates at 37° C. (1) a low convex mucoid sticky colony with an entire edge, whitish yellow in colour and with a fluorescent metallic lustre, (2) a low convex translucent moist colony with an entire edge, greyish in colour.

The dog strain, D 29 (*Bact aerogenes*), showed, when first plated, the former mucoid type of colony only, but the latter grey type was procured quite easily later.

Mucoid colonies were grown at 37° C and examined at intervals. Thin marginal growths began to appear by the second or third day and developed till they were well marked on the fifth day. They appeared sometimes as peripheral outgrowths (fig. 2 (c)), sometimes as wedge-shaped areas of grey translucent growth (fig. 1 (c)). Grey translucent colonies could be procured easily by allowing mucoid colonies to grow for 3-5 days at 37° C and culturing from the grey peripheral outgrowth. It was not so easy to distinguish between the two types of colony when grown on thin layers of agar and there appeared to be no advantage in using horse serum agar or ox blood agar plates for this purpose. It is helpful, however, to use agar plates of a reasonable thickness when the differences exhibited by the two types of colony are well marked. Cultures grown on glycerol egg show a marked differentiation between mucoid and grey colony growths, and this medium is good for preserving the mucoid characteristics of a culture.

A few attempts were made to procure mucoid colonies from growths of the grey type. Cultures of both varieties were grown at 37° C in broth containing a few drops of immune serum and

with the functional value of the reconstructed penis. For a few years I kept thinking of providing an artificial os penis in these cases. When I finally did, the result was gratifying.

A bone graft from the tibia appears to be ideal for making the reconstructed organ stiff enough for good function.

For constructing the urethra in such cases a tubed pedicle of the desired length is made in the midline of the scrotum. In a young patient the urethra is constructed according to the technic of Bergman, and the resulting raw surface on the ventral or scrotal side of the phallus is covered by opening up the scrotal pedicle and suturing it over this raw area. In an elderly patient the simple method of Frumkin is adopted; one attaches the scrotal tubed pedicle along two parallel incisions on the ventral surface of the new penis. The new urethra lies between the abdominal and scrotal tubes that comprise the new phallus. In cases of reconstruction following amputation for carcinoma of the penis, however, construction of the urethra is often dispensed with by creating a permanent perineal urethrostomy.

Repair of Denuded Penis and Damaged Scrotum. — The penis is sometimes entirely stripped of its skin when accidentally caught in machinery. It loses its skin in cases of burn. It is also denuded as a result of excision of the elephantoid skin.

In cases of clean and fresh injury, after bone-dry hemostasis has been obtained, a split skin graft is applied with the penis in a state of moderate traction. Two stay sutures in the glans on either side are used for traction. The graft takes well, is movable and has good functional value.

When there is infection, as soon as it is controlled I prefer to embed the penis in a scrotal tunnel to give it a new covering. In such cases this procedure seems more satisfactory, because the possibility of not "taking" is minimized and the undesirable

subepithelia fibrosis that commonly occurs in such cases is eliminated.

In cases of damage to the scrotal skin, if one-third is left intact, primary closure is often made possible by undermining at the base of the flap and borrowing somewhat from the thigh.

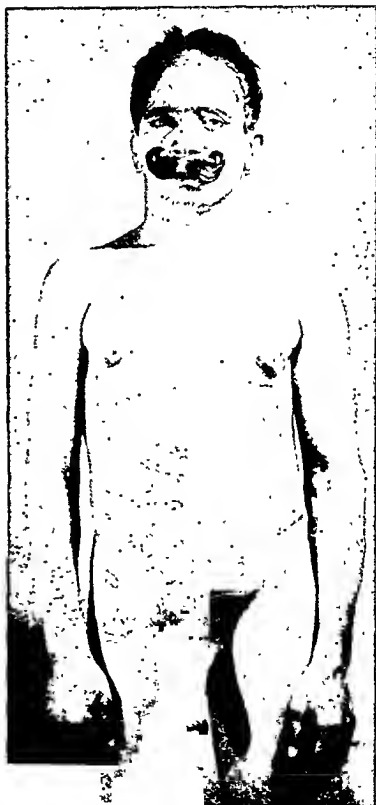


Fig. 5.—Reconstructed penis of desired size, hanging normally. There is a semblance of glans and sulcus behind it.

during the operation when the nose has acquired the desired shape.

Both portions of the structure have several perforations to make them lighter and to allow their fixation in place.

Construction of Prosthetic Structure: A mold of the defective nose is taken and corrected. The positive mold of the defective nose and the negative mold of the corrected nose are set against each other and filled with wax. The result is a model of the needed structure, which should be lengthened in the columellar portion to obtain the desired projection of the nasal tip.

The wax model of the structure is pressed in a dentist's muffle. The wax is liquefied by immersion in hot water for a few seconds. The hollow left when the wax disappears is occupied by an acrylic paste made by mixing a polymerid powder and an isomeric liquid. Pressure is applied several times to prevent bubbles, and a small piece of vitallium is placed according to the need of the individual patient.

The pressed piece is wrapped in tinfoil and placed in the mold, which, mounted in a pressure press, is immersed in boiling water for one hour.

The structure is polished and perforated with a dentist's drill. Sterilization is done in the autoclave with the surgical instruments.

Manner of Introduction: The nose in its entire extent is infiltrated with one point of a local anesthetic (2 per cent procaine hydrochloride plus epinephrine) in the lobule, the needle pointing to the nasal root and changing its direction to the nasal spine (2, Fig. 1).

An incision 6 or 7 mm. long is made in the middle portion of the columella (3, Fig. 1) to a depth that reaches the nasal septum through the columellar portions of the alar cartilages.

Undermining is performed upward to the nasion and backward to the nasal spine. Sufficient lateral undermining must be

done to enable the surgeon to introduce the structure without tension, and to insure that, on contraction of the skin, the prosthesis is not compressed.

Great care must be taken to avoid perforating the skin and the mucous membrane.

The dorsal portion of the structure is first introduced, care being taken to keep its inferior portion far from the cutaneous incision. The columellar portion is then introduced (4, Fig. 1). The inferior end of the dorsal piece is lifted with a hook until the projection desired for the nasal tip is obtained (5, Fig. 1). This point is marked in the columellar piece, which is extracted again in order to section the necessary portion and then restored to its place, in which it is articulated with the dorsal structure. Two or three stitches are applied in the alar cartilages with stainless steel wire No. 38 in an atraumatic needle. The skin is closed with separate stitches of No. 5-0 dermalon.

Postoperative Care.—A plaster of paris splint is applied. It is maintained in place with a transfixion point (made with stainless steel wire tied over ordinary buttons) and adhesive tape. This splint allows excellent immobilization and does not become deformed by postoperative edema (6, Fig. 1).

The stitches are withdrawn within seventy-two hours. The splint is eliminated on the seventh postoperative day.

Terramycin, 1 Gm. daily, is administered during the first seventy-two hours.

The prosthetic structure here described has been applied to 35 patients. In all cases the result is satisfactory.

From the esthetic point of view, I have reached the foreseen result in the models constructed before the operation (Figs. 2, 3 and 4).

From the functional point of view, I have been able to eliminate collapse of the

TABLE I

Biochemical reactions of mucoid and grey variants of four strains of Bact coli and one of Bact aerogenes

	Strains									
	C 32		C 43		C 47		C 73		D 29	
	m	g	m	g	m	g	m	g	m	g
Motility	—	—	—	—	—	—	—	—	—	—
Dextrose	AG	AG	AG	AG	AG	AG	AG	AG	AG	AG
Maltose	AG	AG	—	—	AG	AG	AG	AG	AG	AG
Mannitol	AG	AG	AG	AG	AG	AG	AG	AG	AG	AG
Lactose	AG	AG	AG	AG	AG	AG	AG	AG	AG	AG
Sucrose	—	—	AG (2)	AG (2)	—	—	AG (2)	AG (2)	AG	AG
Salicin	—	—	AG (5)	AG (5)	—	—	AG (2)	AG (2)	AG	AG
Litmus milk	ACB	ACB	ACB	ACB	AC	AC	ACB	ACB	ACB	ACB
Indole	+	+	+	+	+	+	+	+	—	—
Growth in citrate	—	—	—	—	—	—	—	—	+	+
Methyl red	+	+	+	+	+	+	+	+	—	—
Voges Proskauer	—	—	—	—	—	—	—	—	+	+
Eijkmann (45° C)	+	+	+	+	+	+	+	+	—	—
Gelatin liquefaction (22° C)	—	—	—	—	—	—	—	—	—	—

m = mucoid colony

g = grey colony

AG = acid and gas after 24 hours incubation unless numbered (2) or (5), in which case after 2 or 5 days' incubation

+ = positive reaction

— = negative reaction

AC = acid with subsequent clot formation

ACB = acid with clot and subsequent bleaching

Cultures were incubated at 37° C for 10 days unless otherwise stated

TABLE II

Agglutination of suspensions from mucoid and grey colonies of coliform bacilli by acid

Strain		pH.								
		4.8	4.5	4.2	3.9	3.6	3.3	3.0	2.7	2.4
C 32	m	—	—	—	—	—	—	—	—	—
	g	—	—	—	+	++	++	++	++	++
C 43	m	—	—	—	—	—	—	—	—	—
	g	—	—	±	+	+	+	—	—	—
C 47	m	—	—	—	—	—	—	—	—	—
	g	±	±	±	+	+	+	+	+	±
C 73	m	—	—	+	±	—	—	—	—	±
	g	—	±	+	+	+	+	+	+	+
D 29	m	—	—	—	—	—	—	—	—	—
	g	—	—	—	±	+	+	+	±	—

m = mucoid colony

g = grey colony

— = no agglutination

++, + = agglutination

± = trace of agglutination

Reconstruction of the Labia

CHARLES P. VALLIS, M.D.*

LYNN, MASSACHUSETTS

MOST papers dealing with the subject of carcinoma of the vulva describe the radical surgical treatment accepted by most clinics and then present statistics on the survival rates following surgical intervention. Few papers, however, mention the follow-up symptomatic care of the patient, and most of them also fail to mention the distressing symptoms that continue several months or years after the operation.

Actually, carcinoma of the vulva is rare. It has been estimated that of 20 cases of carcinoma of the female genital tract, only 1 is a malignant neoplasm of the vulva.¹ There are several benign lesions of the vulva, however, that frequently require radical vulvectomy—leukoplakia, intractable pruritis and venereal granulomas.

Way² stated that an operation for carcinoma of the vulva is incomplete if it is possible to close the wound primarily. He makes no attempt to close the wound post-operatively, but waits for it to "granulate in." Twombly³ stated that the most difficult problem in radical vulvectomy is to obtain primary wound healing in the groin and that frequently, after primary closure, necrosis of the skin takes place. When this happens the blackened skin area is resected and the granulating area covered with pinch grafts. Cosbie⁴ stated that in his practice primary closure is done whenever possible; in circumstances that make it impossible he does not like to resort to skin grafting but allows the wound to

granulate and undergo spontaneous re-epithelialization. Collins and his collaborators⁵ stated that, in treating malignant disease of the vulva, wide excision at the time of operation is imperative, no consideration being given at the time to the manner of closure of the defect created by the operation. He added that the denuded areas that are not subject to primary closure will heal by granulation, or they can be epithelialized by skin grafts. McKelvey⁶ stated that in his experience a large number of the wounds broke down as a result of cutaneous necrosis due to excessive tension, and that a large number of procedures have been tried in an attempt to avoid this. Leaving the wound open or applying skin grafts at the original operation made no improvement. In his opinion the wound should be left open; subsequent skin grafting or secondary revision is a satisfactory substitute.

A few surgeons have tried to circumvent the frequent occurrence of slough by advocating reconstructive repair of the large denuded area resulting from radical resection of the vulva. The type of graft most commonly employed, however, is the pinch graft. Occasionally one reads a report describing a successful attempt to close the wound with split thickness graft or flap. Robertson⁷ reported 1 case in which, in order to cover the large bare area thus exposed, the adjacent skin was undercut in all directions and, in addition, on the right side a large flap was cut from the thigh and twisted medially so that its upper edge became the right side of the vaginal introitus. Mitchell⁸ reported 1 case of radical vulvectomy done for extensive leuko-

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-12, 1956.

*Instructor in Surgery (Plastic), Tufts Medical School; Consultant in Plastic Surgery, Lynn Hospital and Salem Hospital.

Submitted for publication Sept. 11, 1956.

Further agglutination tests were put up, using antigens prepared from mucoid colonies and their homologous sera only (table IV)

TABLE IV
*Agglutination of formolised suspensions prepared from
mucoid colonies of coliform bacilli*

Suspensions	Immune sera				
	C 32 m.	C 43 m.	C 47 m	C 73 m.	D 29 m
C 32 m	10 tr	—	20	—	—
C 43 m	—	10	—	—	—
C 47 m	10 tr	—	20 tr	—	—
C 73 m	—	—	—	320	—
D 29 m	—	—	—	—	20

Dilutions of sera were from 1 10 to 1 320

Readings are expressed as the reciprocals of the dilutions and are after 4 hours' incubation in a water bath at 55° C

Agglutination was of the granular type

It is therefore apparent that by using mucoid cultures, both for the production of sera and for the preparation of suspensions, it should be possible to obtain more specific reactions. It should be noticed that there is an obvious association between the two strains C 32 and C 47. This similarity assumes greater significance when it is known that both strains were isolated from calves which had been born on the same farm, although a period of approximately one month elapsed between their deaths. On one occasion a suspension of C 73 (m) failed to be agglutinated at 1 50 (table III), whilst at a later date, using the same serum but a different suspension, agglutination was obtained in a dilution of 1 320 (table IV), probably owing to the suspension containing a greater proportion of grey mutants.

It appears as if there are two antigens, one associated with the capsule and the other with the body of the bacillus. Two corresponding antibodies are produced and this is specially so in sera prepared from mucoid strains. Careful search of moist films from mucoid colonies reveals an occasional non-capsulated organism and the antibodies against such variants are easily detected by agglutination reactions. As mutation occurs easily, attempts were made to assess the value of precipitation methods for a similar purpose.

Precipitation

D E Smith (1927) obtained a specific soluble substance which she assumed was the capsular substance from a calf strain of *Bact coli*. About two-thirds the amount of material was obtained from the mutant, but it was obviously impure, as it was 100 times

I checked this patient periodically in my office, and on June 8 it was noted that the whole perineal floor showed softening and there was complete absence of any further scar contraction (Fig. 3 A). She stated that she was considerably relieved and that she no longer had the annoying pulling sensation about the vagina. She was no longer incontinent of urine; she was able to sit comfortably and to climb stairways with much more ease. In addition, there was complete absence of irritation of the skin on the thighs when she walked. I last saw her on April 11, 1956, one year after operation (Fig. 3 B). Examination revealed moderate flattening of the two reconstructed mounds of soft tissue, but the entire area was soft and there was no recurrence of scar contraction. The patient did complain of some tightness over the anterior right hip joint, at the site of the lymph node dissection. This was due to a vertical contracted scar crossing Poupart's ligament. Since this symptom was rather minimal, however, no further surgical intervention was recommended.

This case demonstrates the condition that exists in the perineal region in many patients who have undergone radical vulvectomy. In this patient the wound in the perineum had healed primarily after rad-

ical vulvectomy, and yet considerable scar contraction developed, with accompanying symptoms. I can imagine what the condition of the perineum is when necrosis of the skin develops after vulvectomy and the wound is allowed to heal by granulation. This case is presented in order to describe a simple one-stage procedure for release of scar contractions about the perineum and reconstruction of the labial folds in patients who have annoying symptoms after radical vulvectomy. In selected cases this technic could be employed as a secondary reconstructive procedure when primary skin grafting is contraindicated during the original operation, whether because the patient is classed as a poor risk (usually an elderly patient) or because of the surgeon's reluctance to prolong an already lengthy operation. I am strongly convinced, however, that in many instances and under ideal conditions, proper reconstructive repair during the original operation would obviate this type of secondary procedure.



Fig. 5.—Contracted scarring of left perineal area.

except in the case of C 32 and C 47. As previously mentioned, these two strains are considered to be identical because of similar biochemical, agglutination and precipitin reactions and, as stated, they were isolated from two calves procured from the same farm.

TABLE V

Precipitation tests with carbohydrate extracts of coliform bacilli and sera prepared by injection of formalised cultures

Extracts	Immune sera									
	C 32		C 43		C 47		C 73		D 29	
	m	g	m.	g	m	g	m	g	m	g
C 32 m	+++	+	-	-	+++	+	-	-	-	-
g	+++	+	-	-	+++	++	+	-	-	-
C 43 m	-	-	+++	+	-	-	-	-	-	-
g	-	-	++	+	-	-	+	±	-	-
C 47 m	+++	+	-	-	+++	++	-	-	-	-
g	+++	+	-	-	+	++	-	-	-	-
C 73 m	-	-	-	-	-	-	+++	+	-	-
g	-	-	+	+	-	-	++	+	-	-
D 29 m	-	-	-	-	-	-	-	-	+++	+
g	-	-	-	-	-	-	-	-	+	++

++ = well marked precipitation +, ± = traces of precipitation
- = no precipitation

It appears from the foregoing preliminary study that a precipitin method would be of value for determining the main point at issue, namely, whether special races of *Bact coli* are involved in the production of "white scours" in calves.

APPLICATION OF THE PRECIPITIN TEST IN THE STUDY OF LARGER NUMBERS OF STRAINS OF *BACT COLI* ISOLATED FROM DISEASED CALVES

The remaining strains of *Bact coli* were plated on agar, and if mucoid colonies were apparent, these were selected for precipitin tests. In most cases, however, the colonies were of one type only, being moist and greyish-white in appearance, somewhat intermediate between the mucoid and grey variants described. Nevertheless examination for capsules showed a large number to consist of faintly capsulated organisms.

All strains had previously been shown to be *Bact coli*, giving reactions associated with those of faecal origin. They were Gram-negative rods, the majority being non-motile, growing on MacConkey's agar in the form of red colonies and producing acid and gas in dextrose, mannitol and lactose. Occasionally a strain failed to ferment maltose, whilst the reactions in sucrose and salicin varied. All strains produced indole from peptone water,

culdade encontradas para a síntese de ferida perineal após a vulvectomia total, especialmente indicada para tratamento dos tumores malignos e benignos. As técnicas operatorias descritas tem indicação nos casos de sequelas da vulvectomia comportando também a associação da operação radical e do emprego imediato dos métodos de reparação citados pelo A. Dessa maneira se elimina a necessidade de tratamento reparador em estágio posterior.

REFERENCES

1. Diehel, W. K.; Baggett, J. W., and Shell, J. H. (citing Taussig): Vulval Cancer, *Am. J. Obst. & Gynec.* 62:1209-1218 (Dec.) 1951.
2. Way, S.: *Malignant Diseases of the Female Genital Tract*. London: J & A Churchill, Ltd., 1951, p. 38.
3. Twombly, G. H.: The Technique of Radical Vulvectomy for Carcinoma of the Vulva, *Cancer* 5:3 516-530 (May) 1953.
4. Cosbie, W. G.: The Treatment of Cancer of the Vulva, *Am. J. Obst. & Gynec.* 63:251-259 (Feb.) 1952.
5. Collins, C. G., and others: Malignant Tumors Involving the Vulva, *Am. J. Obst. & Gynec.* 62: 1198-1208 (Dec.) 1951.
6. McKelvey, J. L.: Carcinoma of the Vulva, *Am. J. Obst. & Gynec.* 54:626-635, 1947.
7. Robertson, E. M.: High Lymphadenectomy and Sympathectomy in Carcinoma of the Vulva, *Am. J. Obst. & Gynec.* 55:79-85 (Jan.) 1948.
8. Mitchell, G. W.: Primary Split Thickness Skin Graft Following Vulvectomy, *Bull. New England M. Center* 15:149-155 (Dec.) 1953.
9. Rubin, A., and Lewis, G. C.: Pregnancy and Vaginal Delivery Following Radical Surgery for Carcinoma of the Vulva, *Am. J. Obst. & Gynec.* 65:1347-1349 (June) 1953.

Theories of the scientific method which try to explain the establishment of scientific truth by any purely objective procedure are doomed to failure. Any process of inquiry unguided by intellectual passions would inevitably spread out into a desert of trivialities. Our vision of reality, to which our sense of scientific beauty responds must suggest to us the kind of questions that it should be reasonable and interesting to explore. It should recommend the kind of conceptions and empirical relations that are intrinsically plausible and which should therefore be upheld, even when some evidence seems to contradict them; and tell us also, on the other hand, what empirical connections to reject as specious, even though there is evidence for them and we may as yet be unable to account for this evidence on any other assumptions.

—Polonyi

TABLE VI—*Results of examination by precipitin methods of strains of Bact coli from calves dead from colibacillosis*

Farm	Calf no	Sites of isolation.	Sera								
			76 Int	65 Lung	42 Lung	32 Mar	73 Int	57 Bld	60 Spl.	69 Mar	
H	F 4	Spleen	—	—	—	—	—	—	+	—	
	F 5	Spleen	—	—	—	—	—	—	+	—	
R	F 13	Spleen	+	—	—	—	—	—	—	—	
	3	Blood, spleen	+	—	—	—	—	—	—	—	
	91	Mediastinal gland, liver	+	—	—	—	—	—	—	—	
	17	Blood	—	—	—	—	—	—	—	—	
		Spleen, marrow	—	—	—	—	+	—	—	—	
	42	Lung	—	—	+	—	—	—	—	—	
	43	Blood, lung	—	—	+	—	—	—	—	—	
	57	Blood	—	—	—	—	—	—	—	—	
		Lung, spleen	—	—	—	—	—	+	—	—	
	74	Blood, lung spleen	—	—	—	—	—	+	—	—	
	90	Blood	—	—	+	—	—	—	—	—	
W H		Lung	—	—	—	—	—	—	—	—	
	101	Spleen, mediastinal gland	+	—	—	—	—	—	—	—	
	26	Blood, lung, spleen	—	—	—	—	—	—	—	—	
	W	Lung	—	—	—	—	—	+	—	—	
	32	Spleen, intestinal gland	—	—	—	—	—	—	—	—	
C H		Lung marrow, liver	—	—	—	+	—	—	—	—	
	47	Blood, lung, intestinal gland	—	—	—	+	—	—	—	—	
Ha 1	37	Blood, marrow	—	—	—	—	—	—	—	—	
	50	Blood, lung, spleen	—	—	—	—	—	—	—	—	
	60	Blood, lung, spleen	—	—	—	—	—	—	+	—	
Ha 3		Intestine	+	—	—	—	—	—	—	—	
	58	Lung spleen	—	+	—	—	—	—	—	—	
Ha 5	65	Intestine	+	—	—	—	—	—	—	—	
Ha 7	65	Blood, lung, spleen	—	+	—	—	—	—	—	—	
Ha 9	55	Blood	—	+	—	—	—	—	—	—	
Ha 11	59	Intestine, intestinal gland	+	—	—	—	—	—	—	—	
	61	Blood, lung spleen	—	+	—	—	—	—	—	—	
Ha 12	64	Blood, spleen	—	—	—	—	—	—	—	—	
Ha 16		Lung	—	+	—	—	—	—	—	—	
	70	Blood, lung, spleen	—	—	—	—	—	—	—	—	
Ha 17	72	Intestinal gland	—	—	—	—	—	—	—	—	
	62	Blood lung, spleen	—	—	—	—	—	—	—	—	
Ha 18	77	Intestine	+	—	—	—	—	—	—	—	
Ha 19	76	Blood, lung spleen	—	+	—	—	—	—	—	—	
Ha 20		Blood lung, spleen	—	+	—	—	—	—	—	—	
	73	Intestinal gland	+	—	—	—	—	—	—	—	
Ha 21	78	Intestine	—	—	—	—	+	—	—	—	
Ha 22		Intestinal gland	+	—	—	—	—	—	—	—	
	75	Blood liver	+	—	—	—	+	—	—	—	
Ha 23	79	Intestinal gland	+	—	—	—	—	—	—	—	
Ha 24		Blood, lung spleen, bile	+	—	—	—	—	—	—	—	
	80	Blood, spleen	—	+	—	—	—	—	—	—	
M		Lung	+	—	—	—	—	—	—	—	
	69	Lung, intestine	+	—	—	—	—	—	—	—	
Wa		Lung	—	—	—	—	—	—	—	—	
	89	Marrow	—	—	—	—	—	—	—	+	
		Lung, bile, liver	—	—	—	—	—	—	—	—	
Total number of calves			36								
Total number of strains			95								
Strains classified			69	22	20	4	6	3	8	5	1

piel de la cara en las áreas afectadas. En tales casos, escasez de la fibra elástica de la piel se ha notado. El tratamiento preferido en esos casos fué abrasión quirúrgica y meloplastia y en pocas ocasiones, solo meloplastia. Se cree que los arrugas prematuras pueden deberse a fibrosis en las áreas cicatrizadas tanto como a la escasez del tejido elástico.

RIASSUNTO

Nei pazienti con cicatrici da acne è stata notata una precoce ruosità della cute del viso nelle zone colpite. In tali sedi vi sarebbe una diminuzione delle fibre elastiche cutanee. La cura migliore è la abrasione chirurgica associata a meloplastica o, talvolta, la semplice meloplastica.

Tale precoce rugosità potrebbe essere causata, oltre che dalla diminuzione del tessuto elastico anche da una fibrosi della cute nelle zone cicatriziali.

RÉSUMÉ

Les malades atteints de cicatrices acnéiques peuvent présenter des rides faciales prématurées dans les régions marquées. Dans ces cas une diminution de la fibre élastique de la peau a été constatée. Le

traitement préféré de l'auteur est l'abrasion et la méloplastie chirurgicales, parfois la méloplastie seule. Les rides prématurées peuvent être dues à une fibrose des régions cicatricielles, ainsi qu'à une diminution des fibres élastiques.

ZUSAMMENFASSUNG

Bei Kranken mit Aknenarben kann es zu vorzeitiger Faltenentwicklung der Gesichtshaut in die narbigen Gebiete hinein kommen. In solchen Fällen wird ein Verlust der Haut an elastischen Fasern beobachtet. Die beliebteste Behandlung bestand in chirurgischer Abschabung und Wangenplastik und in manchen Fällen ausschliesslich in Wangenplastik. Die Tatsache wird anerkannt, dass die frühzeitige Faltenbildung ebensowohl durch Fibrose in den narbigen Gebieten zustande kommen kann als durch Verlust elastischen Gewebes.

REFERENCES

1. Iverson, P. C.: *Plast. & Reconstr. Surg.* 2: 427, 1947; *ibid.* 12:27-12, 1953.
2. Andrews, G. C.: *Diseases of the Skin*. Philadelphia: The W. B. Saunders Company, 1945.
3. Straatsma, B. R.: *Plast. & Reconstr. Surg.* 4: July, 1949.

The everlasting pushing and striving of blinded mortals in order to gain so and so much, to secure some honor or other, to do a service to this or that great personage—this is generally fatal to our welfare, this is a common cause of young people ageing and dying before their time.

—Lewis

Bact coli, it is evident that more than one race may be present in a herd or a particular area. On farm "H," two types at least exist, whilst three, with a possibility of a fourth, exist on farm "R." One type only was responsible for the death of two calves on farm "W," but the numbers on any given farm are too small to justify definite conclusions. It seems clear that it is possible by precipitin tests to determine whether one or more types of *Bact coli* are dominating the bacteriology of a herd or area, and, furthermore, whether one or more types are concerned in the disease of an individual calf. In general, although not in all cases, it appears as if one type is the main determining factor in the disease of any calf. Calves 90, 79 and 80 are examples where more than one type has been isolated, and in the case of calves 60, 58, 76 and 78 one type has been isolated from such tissues as blood, spleen and marrow, and another from the intestines or intestinal glands.

DISCUSSION

The primary object of this study was to find a simple technique enabling one to classify strains of *Bact coli* isolated from calves which had died from "white scours." The suggestion that all such strains were not antigenically similar is apparent from the early work of Joest (1903), who found a lack of cross protection with sera prepared from different strains. Biochemical tests appear to be of little value for the purpose of differentiation, for, although it is possible to divide the *coli-aerogenes* group into several divisions according to whether they produce indole, grow in citrate media, give positive or negative Voges-Proskauer, methyl red and Eijkmann tests, all those examined give reactions which would classify them as *Bact coli* type 1. This is apparently the main faecal type, for of 125 strains of *coli-aerogenes* isolated by Wilson *et al* (1935) from cow dung 114 proved to be *Bact coli* type 1. It seems obvious, therefore, that some method other than biochemical is necessary to identify any special strains.

A number of attempts have been made to classify *Bact coli* by serological methods with varying success. Durham (1896-97) found a marked heterogeneity and Mackie (1913-14) records a similar experience. There is some evidence which suggests a relationship between certain varieties and particular infective processes. Dudgeon *et al* (1921, 1922-23) found that *Bact coli* isolated from acute urinary infections were either hæmolytic or non hæmolytic, the former being commoner in men and the latter in women. Most of the former strains were agglutinated by serum prepared against a single strain, whilst the non hæmolytic varieties showed no such antigenic relationship. Agglutinin absorption tests tended to support the view of the relationship of the hæmolytic strains. It was suggested that urinary infection in the male is more likely to be a specific infection, and the results of their study support this. Meyer and Löwenberg (1924) also found that hæmolytic strains from urinary infections and from the intestines tended to be more

courant, soulignant le fait que la greffe idéale est celle qui reproduit le plus fidèlement l'aspect et la structure physiologiques.

Il faut faire preuve de la plus grande prudence pour décider de la nécessité d'une greffe, car bien des lésions peuvent être traitées avec succès par d'autres méthodes. Une étude approfondie de chaque cas est également nécessaire; souvent, en effet, l'on doit tenir compte d'importantes considérations psychologiques.

RESUMEN

Después de un breve resumen de la historia de los injertos de piel, el autor menciona los varios tipos de injertos cutáneos en uso corriente, enfatizando el hecho de que el injerto ideal es el que más se aproxima en apariencia y estructura a la parte que se va a reparar.

También señala que se necesita un criterio cuidadoso para determinar si el injerto es realmente necesario ya que muchas

lesiones pueden, manejarse con éxito sin usarlos. También se necesita un estudio cuidadoso del paciente individualmente ya que frecuentemente se encuentran importantes consideraciones de índole psíquica.

ZUSAMMENFASSUNG

Nach einem kurzen Überblick über die Geschichte der Hautplastik erwähnt der Verfasser die verschiedenen gegenwärtig gebräuchlichen Arten von Hauttransplantaten und hebt hervor, dass das ideale Transplantat dasjenige ist, das der normalen Erscheinung und Struktur des zu ersetzenden Teiles am nächsten kommt.

Er weist ferner darauf hin, dass sorgfältig entschieden werden muss, ob eine Transplantation wirklich nötig ist, da viele Verletzungen auch ohne eine solche erfolgreich behandelt werden können. Weiterhin ist es notwendig, sorgfältig auf die Gesamtpersönlichkeit des Kranken einzugehen, da psychologische Faktoren oft eine bedeutende Rolle spielen.

Without a scale of interest and plausibility based on vision of reality nothing can be discovered that is of value to science; and only our sense of scientific beauty, responding to the evidence of our senses, can evoke this vision. Such is the *selective* function of scientific passion.

—Polyani

of the strains producing this type of colony consisted of bacterial cells showing slight capsules when viewed in a moist india ink film Boivin *et al* (1936) have recently prepared polysaccharides from strains of *Bact coli*, not only from those which form smooth colonies, but also from those which form colonies intermediate in character between smooth and rough variants

Assuming that the classification by precipitin tests is valid, there is little doubt that special races of *Bact coli* exist, but there is as yet no indication of their number or incidence. It is clear that more than one special race may exist on a particular farm or in a given area and that from an individual calf two types may occasionally be isolated. In such cases the second type may be isolated from the intestines or intestinal glands only, but in two instances (79 and 80) the lungs have yielded a different type from the blood and spleen. This may not be the usual occurrence, but it accords quite well with our concept of the disease in question, namely that "white scours" is the result of the shifting of an equilibrium in favour of the *Bact coli* normally present in the digestive tract. Inadequate digestive functions, lack of colostrum or over-distension of the digestive tract may lead to a quantitative increase in the normal flora. Whether invasion of the tissues occurs depends then upon the number and virulence of any particular strain. The recognition of these strains is therefore of importance.

SUMMARY

1 Certain strains of *Bact coli* form mucoid colonies consisting of capsulated bacteria. In these colonies mutants develop which form grey colonies of non-capsulated bacteria. The mutants are agglutinated in buffer mixtures of lactic acid and sodium lactate and to higher titres and less specifically by immune serum than the mucoid-capsulated bacteria.

2 A soluble specific substance, largely consisting of carbohydrate, prepared from both variants produces precipitation of immune sera. By using extracts from mucoid-capsulated strains and immune sera prepared by injection of killed cultures from mucoid colonies it is possible to get specific precipitin results. Similar reactions are obtained with strains forming an intermediate type of colony.

3 By using the precipitin test as a method of classification, 79 of 110 strains of *Bact coli* isolated from calves fall into one or other of eight types.

4 It is concluded that special races of *Bact coli* pathogenic for young calves exist, but that more than one race may be present in a herd and sometimes more than one type may be isolated from an individual calf.

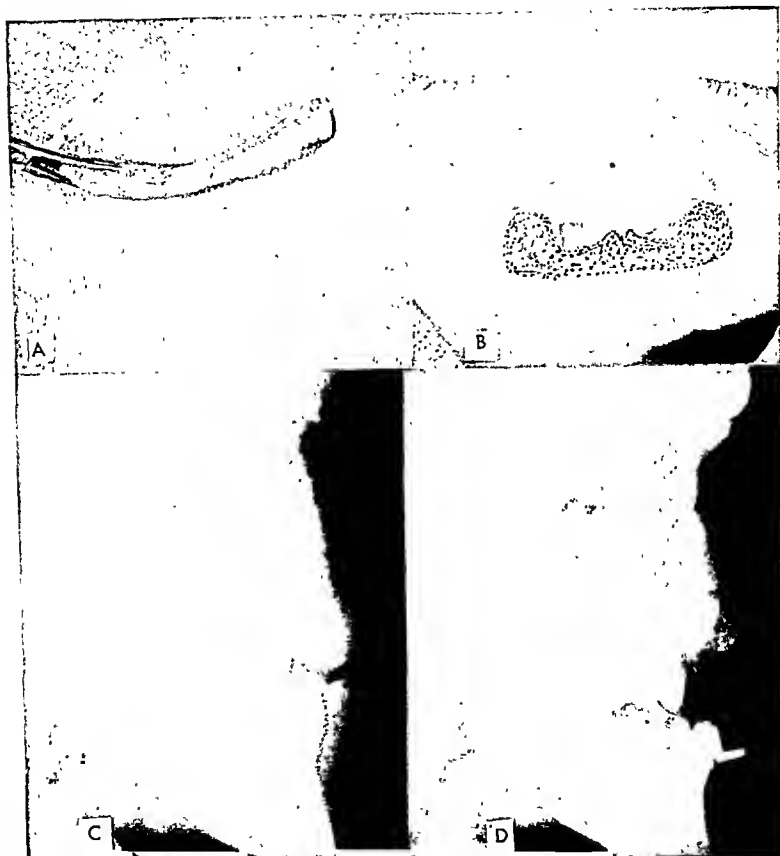


Fig. 4 (Case 2).—A, bone graft employed in case of this patient. B, area of stippling, representing extent of undermining carried out. Incision employed in surgical approach to area can be visualized. C and D, preoperative and postoperative roentgenograms of patient. Note again the extreme underdevelopment and retrusion of the maxilla, with accompanying prognathism.

The operation is carried out with endotracheal anesthesia. The graft is taken from the iliac crest in the conventional manner. The surgical approach to the

upper lip is through a curvilinear incision along the base of either the left or the right ala. Undermining is carried out along the floor of the nose, with exposure

Editorial

Hall of Fame Lectures

MEDIEVAL SURGERY

(CIRCA 500 to 1500)

LOREN C. MCKINNEY*

DURHAM, NORTH CAROLINA

THE history of medieval surgery, like the history of almost any aspect of Western European civilization during the Middle Ages, can be divided into two periods: the early, or so-called "Dark" Middle Age from about 500 to about 1000, and the late, or High Middle Age, from about 1000 to about 1500. Without quib-

bling as to the inaccuracies inherent in any such arbitrary dissection of the corpse of history, I start with a survey of surgery during the first of these periods.

Many writers apply to this early portion of the Middle Ages the Gibbon-esque title, "Decline and Fall of (whatever topic is under consideration)." Although I am temperamentally opposed to epoch generalizations, I adopt this title, in slightly amputated form, as a text for my coverage of Western surgery during the early Middle Ages. I call it merely the "Decline," eliminating the expression "fall," since surgery, like other classic activities did not cease abruptly in 476 A.D. or any other specific date. Nor do I approve of the term "dark." Surgically, and otherwise, the centuries following the disintegration of the Roman Empire were not a black night of barbarism, but rather a roughly vigorous age of reconstruction, of pioneering on new frontiers of civilization. To employ a medical simile, it was as if the weakened body of the late Roman civilization had received a transfusion of sturdy, barbaric, red blood corpuscles.

But, without further historical philosophizing, let us turn to the factual evidence concerning surgery during the period following the death (in Rome) of the sixth-century Greek physician, Alexander of Tralles and (in Alexandria) of his surgically minded successor, Paul of Aegina. These two men, trained in Graeco-Roman

*Professor of History, University of North Carolina
Lecture given at the International Surgeons' Hall of Fame on Dec. 4, 1956, in the series offered by the School of the History of Surgery and Allied Sciences of the International College of Surgeons.



Prof. Loren C. McKinney*
Kenan Professor of History
University of North Carolina

primitive, comprising for the most part simple operations such as bloodletting, which could be performed by almost any intelligent man. Wounds were usually treated medically rather than surgically, by applying medicines, medicated sponges or packs. Thus most ailments could be handled by clergymen or laymen trained in fundamentals comparable to a modern first-aid course. There was no place for a specialized profession.

Occasionally a problem in obstetrics, too complicated for the midwives, might be solved by a cesarean section. In sixth-century Spain a bishop of Merida was reported to have saved a mother as follows: "With marvelous skill he made a neat incision with a fine knife and quickly extracted piecemeal the already putrid infant." From St. Gall in the ninth century comes a slightly different case, one in which the baby was saved and the mother apparently lost. Fourteen days ahead of nature's schedule, according to the chronicler, "the infant was cut out of the mother's body and wrapped in the fat of a newly killed pig."

During this warlike age, there was considerable military surgery, probably of a very primitive sort, the amputation of limbs, for example. The law codes mentioned above contain many brief references to wounds which called for surgery of a sort, but no details are recorded. Ninth- and tenth-century chronicles, likewise, make brief references to operations. There is, however, no evidence of anything but the simplest of methods, like the application of medicines to wounds.

From the sixth century Frankish History of Gregory of Tours, however, comes a noteworthy exception. A Frankish royal physician (called *archiater*) told how he had "excised" a boy's testes, performing the operation "the way he once had seen it done by 'medics' in Constantinople." Here is a rare example of the persistence in the Germanic West of a late Greek professional title and of a Greek operational technic. No details are given as to

instruments and the like. In general, the surgical instruments mentioned in early treatises, and also the finds of archaeologists, reveal only primitive implements, medicinal packings and simple bandages—among them some for hernia.

We already have called attention to the practice of cauterization, which was performed with a heated knife or iron. Although mentioned in the sixth century as a means of eliminating diseased tissues in both human beings and animals, thenceforth until the eleventh century it all but disappears from Western medical literature. Meanwhile a different usage had captured the Arab world; the application of the cautery iron not only to diseased tissues, but also to various places on the body for the relief of internal as well as external ailments, by drawing the noxious humors to the artificial wound. Manuscripts of the later centuries contain illustrations of human bodies marked with red spots (like those for bloodletting) to indicate the places at which the iron was to be applied. The direct cauterization of wounds was more intelligently handled in both Arab and Christian lands.

Already I imagine that some of my hearers are wondering why I have not mentioned Salerno as an example of light in the dark ages. As a matter of fact I am about to mention it, but in a derogatory fashion of which you may disapprove. Our quoted poetic physician notwithstanding, I deny that the "wisdom nurtured at Salerno" constituted a uniquely progressive center in which the torch of enlightened Greek medical science was held aloft. For example, during a quarter of a century or more of perusal of the sources concerning medicine in the early Middle Ages, I have looked in vain for solid evidences of a medical "school" at Salerno.

Without claiming omniscience for the authorities I cite, I wish to present evidence to the effect that medieval surgery and medicine neither began nor ended with Salerno, a name which might well be eliminated from the historical headlines.

excessively large volume of 5 c c of supernatant fluid was used as inoculum to test for infectivity

During recent years Ledingham and others in this country have used the high-speed centrifuge with considerable success to demonstrate the particulate nature of a number of viruses. Thus Eagles and Ledingham (1932) were able to show that vaccinia virus is completely removed by centrifuging at 10,000 *r p m* for 30 minutes and that the virus can be recovered quantitatively from the deposit obtained in this way. Such deposits contain enormous numbers of Paschen bodies and after redispersion and further purification by fractional centrifugation can be used as antigens for agglutination and complement fixation tests. Craigie (1932) and Parker and Rivers (1935) have confirmed many of these findings.

The same technique has recently been applied by Ledingham and Gye (1935) to the study of the fowl sarcoma agents. Sand and paper pulp filtrates of Rous no. 1 sarcoma and of the Fujinami sarcoma were centrifuged at 14,000-15,000 *r p m* for 30 minutes. Chickens were then inoculated with the uncentrifuged extract, the supernatant fluid and the reconstituted deposit, the injections being so arranged that it was possible to obtain a direct comparison between the tumours produced by the uncentrifuged extract and those produced by each fraction. The results indicated that approximately one-half of the agent had been removed from the supernatant fluid while the reconstituted deposit had a tumour-producing activity of about one-half of that possessed by the uncentrifuged extract. Appropriately stained films of the deposits from potent filtrates were found to contain enormous numbers of elementary bodies of apparently uniform size. It was further demonstrated that suspensions of these bodies, obtained by fractional centrifugation of the re-suspended deposits, were agglutinated in specific fashion by the sera of fowls bearing the corresponding tumour. These experiments when taken together appear to be strong evidence in favour of the particulate nature of these avian sarcoma agents. The centrifuge experiments of Ledingham and Gye were quickly confirmed by McIntosh (1935), who employed an air-driven centrifuge designed by himself on the principle of the Henriot Huguenard spinning top. This instrument is capable of speeds of 40,000-60,000 *r p m* and with it McIntosh was able to show that the Rous sarcoma no. 1 agent could be completely sedimented from an active filtrate in 20 to 60 minutes. Stained films showed the presence of "numerous small round bodies with the appearance of elementary bodies".

The experiments of Elford and Andrewes (1935), published very shortly after those of Ledingham and Gye, lend valuable support to the claims made by the latter workers. Cell-free extracts of

from the wound. After this, the testicle is cut away from the intestine with hot irons, a little below the ligature in order not to loosen it. . . . When the putrid and burned flesh comes away, that is to say about the 7th or 8th day, we remove the cord. . . ."

Similarly impressive is a description of intestinal suturing, from the *Surgery of Roger*:

" . . . If the intestine becomes herniated by any wound . . . in the first place if the weather is cold . . . a live animal is cut down the middle and laid upon the intestines and left there until they become warm and . . . softened. Meanwhile a cannula is made of elder wood in the shape of the wound of the intestine, but one inch longer than the wound at each end. . . . It is inserted through the wound, which is sewed with a sharp needle and a silk thread. The cannula is placed there in order that the contents of the intestine may pass through it and that the suture may not make an obstruction. . . . The dirt is washed gently, . . . the intestines are replaced in the abdomen . . . and then the patient is placed on a plank and shaken in order that the intestines may slide into their proper place. . . ."

This technic, which was used by Roger and perhaps by other twelfth-century surgeons, was improved later by substituting for the wood cannula a windpipe cut from an animal. It is obvious that these men were improving on their predecessors in operational procedures.

It is apparent, however, that South Italy, the region of Roger and Constantine, though progressive, was not the only region of progressive surgery. In fact North Italy eventually surpassed Salerno both in the quantity and the quality of its surgical writings. Roger of Salerno was followed by Master Maurus and Johannes Jamati, but Roland of Parma's work centered in North Italy, and the "Four Masters" are thought to have been French. So far as the famous health poem, entitled "The School of Salerno," is concerned, it contains nothing of importance concerning surgery.

Meanwhile Constantine's translations of Arab treatises were being rivaled by new translations by Gerard of Cremona in Spain. As a result the Arabs, Avicenna and Abulcasim, were soon to become as important as the Constantinian translations of Galen and other classic writers.

Shortly after the twelfth century, surgical interest moves northward, leaving Salerno with its past, and fading, glory. However, one final glimpse reveals it, shortly before 1250, as a still flourishing surgical center, recognized as the greatest in his realm by the Hohenstaufen emperor of South Italy and Sicily, Frederick II. The constitution promulgated for his kingdom in 1231 at Amalfi, a few miles up the coast from Salerno, contained detailed regulations "Concerning Medics." They must study for three years as pre-"medics," then five years as "medics," including some study of surgery. After examination and certification by the professors at Salerno, the royal court granted the candidate "a license to practice," but only after one year of apprenticeship under an experienced physician. A surgeon could be licensed separately, after testimonials from his professors proved that "he has studied for at least a year in that field of medicine which develops skill in surgery, and in the anatomy of human bodies, and also that he is proficient in that field of medicine without which incisions cannot be safely made, nor fractures healed." From the fact that the twelfth-century regulations of Frederick's Norman predecessor (King Roger II), on which his were based, contained no specific provisions concerning surgery, we may infer that surgery as a separate profession emerged at some time between 1150 and 1250 at Salerno as well as in more northerly regions. One other point, Frederick's regulations restricted the teaching of medicine and surgery in his realm to Salerno, and to professors licensed by action of both their fellow professors and state officials. The age of state-controlled medical schools and practice had arrived. After the time of Frederick, the record shows more remarkable progress in North

Professor McIntosh was used in some of the experiments. With this instrument a precipitating force of 32,000 times gravity was obtained. The one disadvantage of this type of centrifuge is the small volume of fluid (about 16 c.c.) which it will carry.

These machines were later abandoned in favour of an Ecco Ultima II centrifuge, which also produces a centrifugal force of 20,200 times gravity and has the advantage of being able to carry a total load of 80 c.c. of fluid. It was thus possible to obtain a much larger amount of the purified tumour agent than with the other types of centrifuge.

Preparation of cell free tumour extracts In order to carry out quantitative experiments it was essential to obtain cell free tumour extracts of high potency. Gye and Purdy (1931) and others have found that Chamberland L2 and Berkefeld V and N filters yield filtrates of very variable infectivity. Sand and paper pulp filtrates gave better results but these also failed to show the uniformity that was desired. Finally it was found that cell free extracts of uniform activity could be obtained from tumour tissue which had been repeatedly frozen and thawed. According to Cramer and Foulds (1930) both mammalian and avian tumour cells are killed by a thrice repeated exposure to a temperature of -40°C to -20°C while the Rous no. 1 sarcoma agent is unaffected by this procedure. In view, however, of the experiments on this question described by Gye and Purdy (1931) there seems to be some doubt whether by this means the disruption of every single cell in a mass of tumour tissue can be guaranteed. With lower temperatures the chances of doing so become much greater. Thus, Rivers and Ward (1933) failed to obtain cell proliferation in tissue cultures of chicken embryo tissue which had been frozen five times with CO_2 snow. When the freezing and thawing procedure is combined with a preliminary grinding of the tissue with sand and is followed by thorough centrifugation of the crude tumour suspension the possibility that intact cells are present in the final suspension becomes remote. Careful microscopical examination of deposits obtained by high speed centrifugation of suspensions prepared in the manner described below always failed to show the presence of intact cells.

Five grams of tumour tissue taken from an actively growing area free from hæmorrhage and necrosis are finely minced with scissors and then ground in a mortar with sand together with about 3 c.c. of physiological saline containing 1 part in 10,000 of freshly prepared neutral hydrogen cyanide. The method of preparing the HCN solution is given by Gye and Purdy (1931). The tissue pulp is then transferred to a thin walled glass vessel on the bottom of which it is spread in a layer not more than 3 mm. thick. This vessel is then immersed in the brine tank of an electric refrigerator. The temperature of this brine is -16°C and under these conditions the tumour pulp is frozen solid in 5 minutes. The frozen mass is then thawed by holding the vessel in a stream of tepid water. This sequence is repeated six times. Sufficient HCN saline is then added to give a 5 per cent suspension of tumour tissue. Any other method of producing rapid freezing would, of course, answer equally well.

This crude suspension, now free of living cells, is next centrifuged at 5000 r.p.m. for 20-30 minutes whereby most of the tissue debris is precipitated. The supernatant fluid, which will hereafter be referred to as tumour extract, resembles in its physical characters the filtrates of high protein content obtained with sand and paper filters.

The method of carrying out quantitative centrifugation experiments was as follows. A volume of 4.5 c.c. of tumour extract is

New Books

Books Received.—The following books have been received by the Editor; they will be reviewed critically as space and facilities permit. Omission of more extended review, however, is not to be taken as criticism of the merit of the book.

Bases Physiologiques de la Chirurgie Neuro-Vasculaire (The Physiologic Bases of Neurovascular Surgery). By C. Mentha. Paris: Masson et Cie, 1956. Pp. 148, with 32 illustrations. *Reviewed in this issue.*

Lymphatics, Lymph and Lymphoid Tissue. By Joseph Mendel Yoffey and Frederick Colin Courtice. Cambridge, Mass.: Harvard University Press (for the Commonwealth Fund), 1956. Pp. 510. Illustrated.

Handbook of Physical Therapy. By Robert Shestack. New York: Springer Publishing Company, Inc., 1956. Pp. 212.

Atlas of Tumors of the Nervous System. By H. M. Zimmerman, Martin G. Netsky and Leo M. Davidoff. Philadelphia: Lea & Febiger, 1956. Pp. 191, with 277 illustrations (233 in color).

Etiologic Factors in Renal Lithiasis. By Arthur J. Butt. Springfield, Ill.: Charles C Thomas, Publisher, 1956. Pp. 401, with 153 illustrations. *Reviewed in this issue.*

Chirurgia du Pancréas. By Lucien Leger and Jacques Bréhant. Paris: Masson et Cie, 1956. Pp. 504. Illustrated (collection of Henri Mondor). *Reviewed in this issue.*

How to Enjoy Good Health. Edited by Cyril Solomon and Brooks Roberts. New York: Random House, 1956. Pp. 240.

Diagnostic Procedures for Virus and Rickettsial Diseases. American Public Health Association. New York: Publication Office, American Public Health Association, 1956. 2d ed., Pp. 578. *Reviewed in this issue.*

Head Injuries and Their Management. By Francis Asbury Echlin. Philadelphia: The J. B. Lippincott Company, 1956. Pp. 127, with 10 illustrations.

Pye's Surgical Handicraft. Edited by Hamilton Bailey. Bristol: John Wright & Sons, Ltd., 1956. 17th ed. Pp. 800, with 860 illustrations. *Reviewed in this issue.*

Les Ecrasements Thoraciques (Crushing Injuries of the Chest). By Jean Garby, Michel Garbay and Claude Vanderpooten. Paris: Masson et Cie, 1957. Pp. 182. *Reviewed in this issue.*

The Stress of Life. By Hans Selye. New York: McGraw-Hill Book Company, Inc., 1956. Book V. Pp. 324.

Ciba Foundation Symposium on Bone Structure and Metabolism. By G. E. W. Wolstenholme and Cecilia M. O'Connor. Boston: Little, Brown & Company, 1956. Pp. 299, with 121 illustrations. *Reviewed in this issue.*

Practical Office Gynecology (Obstetrics and Gynecology Series, edited by Caudé E. Heaton). By Albert Decker and Wayne H. Decker. Philadelphia: F. A. Davis Co., 1956. Pp. 388, with 103 illustrations, 19 in color. *Reviewed in this issue.*

Clinical Urology. By Oswald Swinney Lowley and Thomas J. Kirwin. Baltimore: The Williams and Wilkins Company, 1956. 2 volumes, profusely illustrated; drawings by William Didusch.

TABLE I
Results of high speed centrifugation of Rous and Fujinami tumour extracts

Expt. no	Tumour	Tumour extract or filtrate	Centrifuge	Revolutions per minute	Centrifugal force \times gravity	Duration of run (mins.)	Titro of extract.	Titro of supernatant	Titro of reconstituted deposit
I	Rous no 1	Berkofold V	Baskerville	12,000	11,300	120	1 100	Nil	
III	Fujinami	"	"	14,000	16,400	45	1 100	1 10	
V	"	"	"	14,000	15,400	90	1 100	1 1	1 100
		"	"	12,000	11,300	45	1 10	1 10	
		"	"	12,000	11,300	90	1 10	1 1	
VI	Rous no 1	Sand and paper pulp	"	12,000	11,300	135	1 10	1 1	1 10
		"	"	10,000	7,840	120	1 10	1 1	1 10
VII	"	"	"	12,000	11,300	180	1 500	1 100	1 10
IX	Fujinami	Frozen and thawed	"	12,000	11,300	180	1 500	1 100	1 10
XIII	Rous no 1	"	Baskerville (new model)	14,000	17,600	00	1 100	Nil	1 100
XVI	Fujinami	"	"	13,000	16,100	105	1 1000	1 100	1 1000
XVII	"	"	"	15,000	20,200	75	1 500	Nil	1 500
XVIII	"	"	"	15,000	20,200	60	1 1000	"	1 500
XIX	"	"	"	15,000	20,200	60	1 1	1 1	1 1000
X	"	"	"	18,000	9,000	30	1 5000	1 100	
XI	"	"	Air turbine	33,000	30,500	30	1 500	Nil	1 500
XII	"	"	"	33,000	30,500	30	1 500	1 10	1 500
XX	"	"	"	33,000	30,500	30	1 100	Nil	1 100
XXI	Rous no 1	"	Ecco Ultima	15,000	20,200	50	1 500	1 10	1 1000
XXII	"	"	II	15,000	20,200	50	1 500	1 10	1 100

NEW, IMPROVED MUELLER-BALFOUR ABDOMINAL RETRACTOR



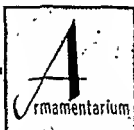
SU-3040—Complete .. \$75.00

Now the interchangeable, spring-tempered wire blades lock simply, but securely, in the side arms *without* thumb screws or other losable parts.

This versatile Retractor has the exclusive spring-latch construction and wide bar, notched for easy adjustability and permanent non-slip retention.

With its adaptability and its six interchangeable blades, the Mueller-Balfour Retractor is both a standard retractor and a deep retractor—in one instrument. Stainless steel.

As described in *Armamentarium* Vol. II, No. VIII.



MUELLER & CO.

330 South Honore Street

Chicago 12, Illinois

Dallas • Houston • Los Angeles • Rochester, Minn.

Hastens

WOUND HEALING

An increasingly popular wound dressing technic that provides marked clinical advantages and greater patient comfort

CHECK THESE HIGHLIGHTS . . .

- Nature of special weave serves to block capillary penetration into the substance of the fabric, thus tending to aid and hasten tissue repair . . . pain and bleeding are greatly reduced when dressing changes are called for.
- This scientifically developed fabric provides desired permeability which permits adequate drainage . . . tissue granulations are normally characterized by smooth, red and velvety appearance.
- This non-grease fabric has an extremely low coefficient of friction, thus exerting a minimal irritating effect when applied in direct contact to the wound surface . . . indicated in burns, granulating areas, surface wounds, donor skin graft sites and allied conditions.

Owens
SURGICAL FABRIC

Made of Fortisan®—A Celanese® rayon yarn
*Reg. U.S. Pat. Off.

AVAILABLE in 41" width rolls of 5, 10, 25 and 50 yards.

WRITE FOR SAMPLE and clinical reprint describing technic of application.

ORDER THRU YOUR DEALER or write direct for further information.

WINCHESTER MILLS, INC.

120 West 42nd St.

New York 36, N. Y.

fluid By a repetition of this procedure of high-speed centrifugation followed by clarification of the resuspended deposit it is possible finally to obtain a suspension which is free from fowl protein yet still actively tumour-producing In order to test for the presence of fowl protein a potent anti-fowl serum prepared by immunising rabbits with fowl blood was used for precipitin tests with the suspensions as antigen The multiple proportions method was used and tests were carried out at room temperature, at 37°C and at 55°C The crude reconstituted deposits obtained from the first high-speed centrifugation gave a definite flocculation readily observed with the naked eye, but no such flocculi were obtained when the final suspension was used as antigen, even when the serum-antigen mixtures were examined microscopically by the method of high-power dark-ground illumination Repeated fractional centrifugation necessarily entails a heavy loss of the tumour agent From 50.0 c.c. of tumour extract it was not usually possible to obtain more than 3.0 c.c. of a suspension which was free from fowl protein and at the same time of high tumour-producing activity The potency of these suspensions was usually such that a typical tumour was produced with 0.00025 c.c. (0.25 c.c. of a 1:1000 dilution of the original suspension) Although the method of preparation entailed considerable loss of the agent it must be emphasised that once a pure suspension had been obtained repeated washing of the suspended material failed to dissociate the tumour-producing property from it This fact is essential to the concept of a particulate causal agent and its experimental verification was complete

Microscopic examination of purified suspensions

The microscopic study of the larger virus elementary bodies, such as those of vaccinia, fowl-pox and psittacosis, is of definite value provided that the many possible sources of error have been learnt by long experience of the methods employed The information obtained with the microscope must be correlated with the results of serological experiment and of animal inoculation if this is possible The direct examination of virus-containing fluids by dark-ground illumination is regarded as the method of choice by those who are conversant with the theory and practice of microscopic image formation Some workers still do not appreciate the difference between the terms *visibilty* and *resolution* as applied to microscopic images For present purposes, an object may be said to be resolved when the image obtained is an almost perfect representation of that object Under the conditions of high-power microscopy, however, errors due to the refraction of light, which are inherent in the optical system and cannot be overcome, become

Comments by the Founder

PROMISE AND FULFILLMENT

In that memorable year 1935, when "something new under the sun" was burgeoning into actuality and putting forth its first twigs of promise, now branching all over the world as the International College of Surgeons, I received some singularly wise and forward-looking counsel from a dear and honored colleague and friend, Dr. André Crotti. "We must never for a moment forget," said Dr. Crotti, "that our purpose is to plan and establish a college. We must begin and end as a teaching organization. In no other way can we avoid the loss of direction and scattering of attention and effort that assail so many other professional organizations. Since our principal aim is to disseminate surgical knowledge on a basis of international friendship, we cannot neglect the prime duty of every surgeon to pass on to others, for the ultimate good of humanity, whatever his studies and his experience have taught him."

Of no man can it be said more confidently than of Dr. Crotti that he is a living example of the great truth, "If thine eye be single, thy whole body shall be full of light." In this instance the light of Dr. Crotti's wisdom was fully shared by myself, and I gave him my solemn promise that as long as I lived I would exert all my efforts toward maintaining the College first of all as a teaching institution. I am proud to say that I have never been unmindful of that promise and have done everything in my power to fulfill it.

Today it is obvious that this effort has been successful. The educational activities of the College extend far and wide. We are in intimate liaison with the Faculty of Medicine of Vienna and many other European faculties. Many of those who regularly offer postgraduate courses under the auspices of the College, and many others



Dr. Max Thorek

who open their clinics and hospitals to visiting Fellows of the College from other nations, are among the most eminent and learned surgeons of the world. To mention only a few, these include Profs. Darget of Bordeaux, Soler-Roig of Barcelona, Paolucci of Italy, and Mandl and Schönbauer of Vienna. The late Prof. Hans Finsterer, whose learning and skill long since earned his permanent fame, was President of the College and for many years one of its staunchest supporters.

In addition to the courses offered by these world-famous colleagues and by Fellows of like stature in many other nations, we have recently set in motion our annual *Around-the-World Postgraduate Courses and Surgical Clinic Days*, which have brilliantly met and greatly exceeded all expectations. The first of these, which took place in 1955 and which I was fortunately able to accompany as participant and official guide, carried us to Hawaii, Japan, Formosa, the Philippines, Hong Kong, Thailand, India, Pakistan, Israel, Turkey, Greece and Italy. The second, in 1956, under the leadership of Dr. Neal Owens, included visits to Hawaii, Japan, Formosa, the Philippines, Hong Kong, Thailand, India, Pakistan, Iran, Turkey and Greece. The 1957 tour will be conducted by Dr. Arnold S. Jackson, immediate Past President of the United States Section of the College, and Dr. Edward L. Compere will officiate in 1958. Wherever the visiting surgeons go, they receive a royal welcome and are privileged to attend the lectures, demonstrations, operations and clinics of

Mr. Edouard Chassaing, noted sculptor of the Chicago Art Institute, finishing statue of Pasteur. The completed work will be placed in the Speidel Hall of Immortals, International Surgeons' Hall of Fame.

fluid By a repetition of this procedure of high-speed centrifugation followed by clarification of the resuspended deposit it is possible finally to obtain a suspension which is free from fowl protein yet still actively tumour-producing In order to test for the presence of fowl protein a potent anti-fowl serum prepared by immunising rabbits with fowl blood was used for precipitin tests with the suspensions as antigen The multiple proportions method was used and tests were carried out at room temperature, at 37° C and at 55° C The crude reconstituted deposits obtained from the first high-speed centrifugation gave a definite flocculation readily observed with the naked eye, but no such flocculi were obtained when the final suspension was used as antigen, even when the serum-antigen mixtures were examined microscopically by the method of high-power dark-ground illumination Repeated fractional centrifugation necessarily entails a heavy loss of the tumour agent From 50.0 c.c. of tumour extract it was not usually possible to obtain more than 3.0 c.c. of a suspension which was free from fowl protein and at the same time of high tumour-producing activity The potency of these suspensions was usually such that a typical tumour was produced with 0.00025 c.c. (0.25 c.c. of a 1:1000 dilution of the original suspension) Although the method of preparation entailed considerable loss of the agent it must be emphasised that once a pure suspension had been obtained repeated washing of the suspended material failed to dissociate the tumour-producing property from it This fact is essential to the concept of a particulate causal agent and its experimental verification was complete

Microscopic examination of purified suspensions

The microscopic study of the larger virus elementary bodies, such as those of vaccinia, fowl-pox and psittacosis, is of definite value provided that the many possible sources of error have been learnt by long experience of the methods employed The information obtained with the microscope must be correlated with the results of serological experiment and of animal inoculation if this is possible The direct examination of virus-containing fluids by dark-ground illumination is regarded as the method of choice by those who are conversant with the theory and practice of microscopic image formation Some workers still do not appreciate the difference between the terms *visibility* and *resolution* as applied to microscopic images For present purposes, an object may be said to be resolved when the image obtained is an almost perfect representation of that object Under the conditions of high-power microscopy, however, errors due to the refraction of light, which are inherent in the optical system and cannot be overcome, become

From the Executive Director's Notebook

In several past issues of the Bulletin, reference has been made to the surgical symposium recently conducted by the International College of Surgeons in conjunction with the University of Santo Domingo. As this program falls in line with the overall educational program that the College has projected, it is my belief that the comments of the surgeons who participated in this excellent work in Santo Domingo should be given in some detail for the information of our Fellows.

On August 20, 1956, the program was inaugurated—and at that time it was my pleasure to go to Santo Domingo for the opening session. Two of our outstanding thoracic surgeons opened the scientific program, Doctor Samuel Thompson and Doctor Victor DeLuccia, both of New York. A typical week's program can be described as follows:

Monday was given over to official calls by the visiting surgeons and discussions with the President of the University and the Secretary of Health, as well as the staff of the medical school. The hospitals, four in number, are modern in every respect. These were visited and the operative program decided upon, as well as the selection of patients. These hospitals are well equipped and adequately staffed as far as medical personnel is concerned. Postgraduate opportunity for the average doctor of medicine in Santo Domingo is not available, unless by individual effort a surgeon can travel to South America, Europe or the United States. It was with this thought in mind that the President of the University of Santo Domingo, an outstanding educator, believed that much good could come from a teaching program in general surgery and the specialties.

Following visits to the University and the hospitals, the next event in the program was the open meeting held at the University for all doctors of medicine in

the Islands. Lectures by the visiting surgeons, Drs. Thompson and DeLuccia, with excellent illustrations and motion pictures, were given to some three hundred guests. The President of the University spoke briefly, and your Executive Director responded for the United States.



Dr. Ross T. McIntire
F.A.C.S., F.I.C.S.

Tuesday saw the inauguration of actual surgery. The operations performed included pneumonectomies for multiple cysts of the lung, as well as for carcinoma. Operation on the heart was performed for the first time in Santo Domingo—a commissurotomy for mitral stenosis caused by rheumatic fever. This operation was performed on television, and, as there is but one television station in the Island, the audience included everyone who owned a set. This gave the average citizen an opportunity to know what could be accomplished by surgery. In a few days the patients who had undergone operations appeared on television to give assurance to the people of Santo Domingo that the operation was successful.

Dr. Thompson's comment was as follows:

"A simple description of the lectures and operation does not do justice to the symposium. The enthusiasm and earnestness of the Dominican doctors, many of whom came from great distances and at some sacrifice, to hear lectures given in a foreign language, cannot be adequately described. The intense desire of those doctors in the crowded operating amphitheater to see and learn new techniques description.

normal fowl spleen and of normal fowl leucocytes, prepared in exactly the same manner as the tumour agent suspensions, were employed as controls

From the theoretical considerations given above it is evident that decisive results were not to be expected with an infective particle which had only half the diameter of a Paschen body. This anticipation proved to be correct. The purified tumour agent suspensions when examined by dark-ground illumination contained large numbers of particles which varied in size and density within fairly narrow limits. The suspensions prepared from normal fowl tissues also contained many particles below the limit of optical resolution. Some of these were indistinguishable from those found in the tumour suspensions but they were never present in large numbers. In the case of the tumour agent suspensions each microscopic field was filled with particles of optically similar characters, an appearance never given by the control suspensions, and by this criterion the two types of suspension could be differentiated with a fair degree of certainty. No definite conclusions could be reached in the case of fixed and stained preparations.

A further difficulty was encountered when an attempt was made to correlate the results of microscopic examination with tumour-producing activity. The purified suspensions usually produced a tumour when 0.25 c.c. of a 1:1000 dilution was inoculated, higher dilutions being inactive. 1.0 c.c. of the undiluted suspensions therefore contained 4000 minimal infecting doses. Although no attempt was made to determine the total number of particles present in a unit volume of the suspension, it was obvious that this number was vastly in excess of the 4000 per c.c. required on the assumption that one infective particle was capable of initiating a tumour. It was necessary to infer, therefore, that either the number of particles required for 1 *m.i.d.* is very large or that many of them, even in freshly prepared suspensions, are already inactive. The alternative argument that many of the particles in these tumour agent suspensions were merely cell fragments seems to be adequately ruled out by the fact that hyperimmune anti-fowl sera did not flocculate them. The anti-fowl sera produced very obvious flocculation of the control suspensions prepared from normal fowl tissues.

Although the evidence given above does not justify the categorical statement that the Rous agent exists in the form of elementary bodies which are recognisable under the microscope, it can yet be said with certainty that the tumour-exciting property resides in the particles described, since repeated washing of a purified tumour agent suspension fails to dissociate the agent from this particulate material. Further evidence is afforded by the serological experiments next to be described.



Dr. Virgilio DíazOrdáñez, Rector of the University of Santo Domingo, Dr. Gershom Thompson and Dr. Max Brodny, among others, attend a session at the opening of the week of urologic surgery.

mingo for the past fifteen years. During that time he has taught a large number of local surgeons. Consequently, there are an outstanding number of plastic surgeons in the hospitals. Dr. Maltz and Dr. Tausand performed some twenty-two difficult operations. Some of the patients I saw two months after their operations, and the results were uniformly excellent.

Dr. Tausand performed some excellent operations. Although he was unable to speak Spanish to any extent upon his first visit, he demonstrated two months later, in follow-up work, that Spanish could be learned in that short space of time. This, of course, made his service especially effective.

The fourth week was given over to obstetrics and gynecology. Because of the great volume of work in this field, it was decided to increase the number of surgeons for this particular week. Dr. Horace Ayers, who went to Santo Domingo with me for preliminary talks with the University, was in charge of this team; the three

additional members were Dr. Gilbert Douglas of Birmingham, Alabama, and Drs. John Mussio and Richard Gorhea, both of New York City. Dr. Gorhea, a young doctor and a native of Puerto Rico, was of great assistance because of his knowledge of Spanish.

The maternity hospital is a four-hundred bed affair—modern in every respect—and has a continuously full load of patients. Dr. Douglas, who has visited many parts of the world, was most enthusiastic over the modern hospitals and their facilities. He was greatly impressed by the schedule of the local doctors. In his report, he said, "With what we saw in Santo Domingo and what has been suggested previously, it looks as if a similar pattern, adapted, of course, to the needs of each country, might be of great value to other Central or Latin American countries." It should be clearly understood, however, that programs would be formed only upon the request of a university in any of the American countries.

on the same day that the blood was collected, since agglutinins rapidly disappear when the serum is kept. The addition of fresh guinea pig complement fails to reactivate sera that have lost their agglutinating properties through storage.

The sera of 75 fowls were examined on one or more occasions for this agglutination reaction. Adult birds were used when agglutinin production was the primary object of the experiment, but the response of a number of 8-12 weeks' old chickens used for the titration of tumour extracts and suspensions was also studied. The usual procedure was to examine the serum prior to inoculation and to re-examine at intervals following the injection of cell-free extracts, purified suspensions or cell transplants of Rous and Fujinami sarcomata. The results obtained cannot easily be summarised owing to the many variable factors which were operating, but the following are the main facts which emerged from these experiments.

1 *Agglutination tests on sera of uninoculated fowls* Tests carried out on the sera of 46 normal chickens aged 8 to 12 weeks gave uniformly negative results. A similar experience was obtained with sera of 4 normal adult plymouth rock fowls and 8 normal white leghorns, all of which were later found to be susceptible to the Rous agent. Agglutinins were however found to be present in 8 out of 20 adult brown leghorns received from the Institute of Animal Genetics, Edinburgh University. None of these had previously been inoculated with any tumour, neither had they been in contact with other tumour-bearing fowls. A summary of the experiments performed on them is given below.

No 137 Adult brown leghorn hen. Serum tested before inoculation no agglutination with two Rous suspensions and one Fujinami suspension. It then received 1.0 c.c. of a Rous suspension equivalent to 400 *m.i.d.* as determined by titration in a group of 4 chickens. On the 13th day following inoculation a tumour was palpable and the serum tested against the same suspensions was still negative. On the 19th day the tumour had more than doubled its size the serum was again negative. The bird was moribund on the 30th day and was killed. A large hæmorrhagic tumour was found. The blood taken immediately after death again failed to agglutinate the tumour suspensions.

No 138 Adult brown leghorn hen. Serum tested before inoculation agglutinins for the Rous suspension present to a titre of 1/32 (two different suspensions) but not for a Fujinami suspension. It then received 1.0 c.c. of a Rous suspension, equivalent to 400 *m.i.d.* as determined by titration in a group of 4 chickens. A tumour was first palpable on the 26th day. On the 19th and 26th days the serum titre for the same Rous suspensions was 1/64. The bird was moribund on the 33rd day and was killed. The blood taken immediately after death agglutinated the same two Rous suspensions to a titre of 1/64. Definite agglutination to a titre of 1/16 was also obtained with the same Fujinami suspensions that gave a negative result with the serum taken prior to agglutination.

man Clinic in Canton, and President of the staff of the Graham Hospital of the same city. He was married to Gladys Huff, of Atlanta, Illinois, in 1917. Their two

children are Eleanor Irene Coleman of New York City and Louise (Coleman) Scott, wife of Senator Albert Scott of Canton, Illinois.

LEGAL ADVISERS OF THE INTERNATIONAL COLLEGE OF SURGEONS

Mr. Alvin Edelman, attorney and counselor, the newly appointed legal adviser of the International College of Surgeons, is a forty-year-old Chicagoan. He received his preliminary education in the Chicago Public Schools and then attended Northwestern University in Evanston, Illinois, graduating with the degree of a Bachelor of Science in Law. He was a member of the Northwestern University Debating Team; was elected to Pi Eta Sigma, and to Phi Beta Kappa, the honorary scholastic fraternity. He was active in Inter-Fraternity Council work.

He studied law in the Northwestern University School of Law, from which he received the degree of Bachelor of Laws. He was Associate Editor of the *Illinois Law Review*, now known as the *Northwestern Law Review*. He is the author of a number of articles on law published in different legal periodicals.

Mr. Edelman is an active member of the Chicago Bar Association, serving most recently as a member of the Committee on Inquiry and the Committee on Medical Legal Relations. He has served as President of Tau Epsilon Rho, International Law Fraternity Alumni Association, and is a Past President of the Phi Epsilon Pi Fraternity Alumni Association. He is a member of the American Bar Association.

Mr. Edelman is Past Master of Isaac Cutter Lodge No. 1073, A.F. & A.M., a thirty-second degree Mason and a member of Medinah Shrine. He is a member of the Elks, holding an Honorary Life Membership, and last spring completed his term in

office as Exalted Ruler of Chicago Lodge No. 4, B.P.O. Elks.

He served in the United States Coast Guard Auxiliary as District Legal Officer for the Ninth United States Coast Guard Auxiliary District, and is presently Commander of Flotilla 22-8. He is active in a number of civic organizations, and has for several years served as Chairman of Zone 2 of the Lawyers' Division of the American National Red Cross.

Mr. Edelman is married and has three children, and is a resident of Glencoe, Illinois.

Mr. Roland Steiner, Advocate of the Geneva Bar, was recently appointed as the legal representative for the International College of Surgeons in Europe. Mr. Steiner was born in Geneva, Switzerland, on Jan. 1, 1918. His elementary and secondary education was secured in the city of his birth, where he had a scientific and classic training, graduating in 1936.

Mr. Steiner then entered the University of Geneva, where he pursued his studies in law. He earned a degree in law in 1942. He took graduate training at the University of Neuchâtel, in Switzerland, where he concentrated on the study of the economic and business sciences, in which he was awarded a degree in these subjects in 1943 and in law in 1944.

From the beginning of 1945 until the summer of 1946, he served in Paris as an official delegate of the International Red Cross Committee. Since the autumn of 1946, Mr. Steiner has been practicing law in Geneva.

on the same day that the blood was collected, since agglutinins rapidly disappear when the serum is kept. The addition of fresh guinea pig complement fails to reactivate sera that have lost their agglutinating properties through storage.

The sera of 75 fowls were examined on one or more occasions for this agglutination reaction. Adult birds were used when agglutinin production was the primary object of the experiment, but the response of a number of 8-12 weeks' old chickens used for the titration of tumour extracts and suspensions was also studied. The usual procedure was to examine the serum prior to inoculation and to re-examine at intervals following the injection of cell-free extracts, purified suspensions or cell transplants of Rous and Fujinami sarcomata. The results obtained cannot easily be summarised owing to the many variable factors which were operating, but the following are the main facts which emerged from these experiments.

1 *Agglutination tests on sera of uninoculated fowls* Tests carried out on the sera of 46 normal chickens aged 8 to 12 weeks gave uniformly negative results. A similar experience was obtained with sera of 4 normal adult plymouth rock fowls and 8 normal white leghorns, all of which were later found to be susceptible to the Rous agent. Agglutinins were however found to be present in 8 out of 20 adult brown leghorns received from the Institute of Animal Genetics, Edinburgh University. None of these had previously been inoculated with any tumour, neither had they been in contact with other tumour-bearing fowls. A summary of the experiments performed on them is given below.

No 137 Adult brown leghorn hen. Serum tested before inoculation no agglutination with two Rous suspensions and one Fujinami suspension. It then received 10 c.c. of a Rous suspension equivalent to 400 m.i.d. as determined by titration in a group of 4 chickens. On the 13th day following inoculation a tumour was palpable and the serum tested against the same suspensions was still negative. On the 19th day the tumour had more than doubled its size the serum was again negative. The bird was moribund on the 30th day and was killed. A large hæmorrhagic tumour was found. The blood taken immediately after death again failed to agglutinate the tumour suspensions.

No 138 Adult brown leghorn hen. Serum tested before inoculation agglutinins for the Rous suspension present to a titre of 1/32 (two different suspensions) but not for a Fujinami suspension. It then received 10 c.c. of a Rous suspension, equivalent to 400 m.i.d. as determined by titration in a group of 4 chickens. A tumour was first palpable on the 26th day. On the 19th and 26th days the serum titre for the same Rous suspensions was 1/64. The bird was moribund on the 33rd day and was killed. The blood taken immediately after death agglutinated the same two Rous suspensions to a titre of 1/64. Definite agglutination to a titre of 1/16 was also obtained with the same Fujinami suspensions that gave a negative result with the serum taken prior to agglutination.

MALPRACTICE LIABILITY INSURANCE
International College of Surgeons

In view of the many inquiries that have been received for more specific information about the malpractice liability insurance, offered by the International College of Surgeons, through Lloyd's of London, we are summarizing the information that appears on the certificate of insurance.

The Underwriters at Lloyd's, London, agree subject to the provisions contained in the certificate to indemnify each member of the International College of Surgeons named on the schedule of insured persons for any and all sums which the insured person shall by law become liable to pay in respect of professional services rendered, or which should have been rendered, by the insured person or nurses or technicians employed by the insured person, or any other person (except partners, unless specifically endorsed on the certificate) resulting from any claim or suit based solely upon error, negligence or mistake committed during the period of the insurance.

The insurance also extends to cover the liability of the insured person for malpractice (as defined in the preceding paragraph) by any locum-tenens employed by the insured person to continue the practice of the insured person in his absence, provided that this insurance shall only cover malpractice committed by such locum-tenens during any one or more periods not exceeding thirty days in the aggregate during each consecutive period of twelve months commencing from the inception date of this insurance. If the insured person employs a locum-tenens for more than thirty days in the aggregate during any one annual period of insurance the protection afforded by this insurance shall be limited to the first thirty days in the aggregate during such period.

Irrespective of the number of persons named as the assured or added by endorsement under one insured person's certificate the liability of the underwriters for damages on account of malpractice shall not exceed the limit of liability stated earlier, except that, subject to the provisions contained on the certificate, the underwriters will in addition pay the costs and expenses incurred in the defense of any claim or suit.

This insurance does not cover any liability of an insured person which is insured or would, but for the existence of this insurance.

be insured by any other insurance, except in respect of any excess beyond the amount which would have been payable under such other insurance had this insurance not been effected.

Notwithstanding anything contained in the certificate to the contrary the total liability of the underwriters in respect to malpractice arising from the use of portable fluoroscopes or other fluoroscopes where a hand or head screen is employed shall be limited to \$2,500 in all in any one annual period of insurance per insured person, and the insured person shall bear uninsured the first \$500 of each and every claim.

No liability shall attach to the underwriters in respect of (a) criminal acts, or services rendered while under the influence of intoxicants or drugs; (b) contact lenses, and (c) the performance of or the recommendation of any operation to produce sterility unless the insured person shall be able to establish pathologic indications for such operation.

[illegible]

Facsimile of certificate of malpractice liability insurance effected with Lloyd's of London.

In spite of this immune response, however, these birds died within 3 to 7 weeks with large tumours and the usual metastases. Of the 4 birds which proved resistant to inoculation 2 produced agglutinins. Repeated injections of active filtrate into these birds still failed to incite tumour production and the agglutinin titre of the serum was maintained or decreased. This immunity to the Rous agent was not however accompanied by any resistance to Rous cells, for large tumours were produced in both birds by means of cell transplants.

iii *Agglutination tests on fowls inoculated with cell-free extracts or purified suspensions of the Fujinami agent* A positive reaction was obtained in 15 out of 32 fowls which produced tumours. Complete regression of the growth took place in 9 of the 15. The 17 birds in which no agglutinin response occurred all died with large tumours within one month of inoculation. Of 10 other fowls which proved resistant to Fujinami agent 4 showed agglutinins in low serum dilutions. Fatal tumours were later produced in each of these birds by means of Fujinami cell transplants.

iv *Agglutination tests on fowls inoculated with cell transplants* In the case of actively growing Rous tumours which proved fatal within a few weeks, agglutinin production was either absent or present only in low dilutions. In 4 out of 5 birds inoculated with transplants of a slowly growing Fujinami sarcoma a small tumour followed by complete regression occurred, and in each of these a positive reaction was obtained, the highest titres being reached shortly before the tumour completely disappeared. Repeated attempts to induce a second tumour by means of transplants of actively growing Fujinami sarcoma tissue were unsuccessful. A rise in the agglutinin content of the serum followed each re-inoculation.

v *Co-existence of agglutinins and neutralising antibodies* Parallel tests on the agglutinin content and neutralising power of Rous and Fujinami immune sera demonstrate clearly that these two properties are closely related. The serum of young normal chickens was found to have no inhibitory effect upon tumour extracts or purified tumour agent suspensions, neither was any measurable amount of neutralising antibody present in non-agglutinating sera taken from young chickens bearing rapidly growing tumours. Appreciable neutralisation was obtained, however, with serum taken from older fowls with slowly growing or regressing tumours. The following experiment illustrates this.

No 227 Brown leghorn, age about 4 months. The blood taken before inoculation did not agglutinate Rous or Fujinami suspensions. The bird was inoculated in both breast muscles with 0.1 c.c. of minced Fujinami tissue. On the 12th day both breasts contained tumours weighing probably 10-15 g. Blood was taken on this day and again on the 17th day, by which

the thirtieth of May, there begins a meeting of the New York and Canadian Sections at White Face Inn at Lake Placid, New York, and in early July, at the Balsams at Dixville Notch, New Hampshire, there will be held the traditional mid-summer meeting of the Eastern Region under the leadership of the Regent from Massa-

chusetts, Dr. Leopold Brodny of Boston.

Here are four pleasant breaks for the busy surgeon—guaranteed to relax the keyed up nervous system and unhardens the arteries. It would give me extreme pleasure to meet you, my brother surgeon, at each of these delightful assemblies.

IMPORTANT NOTICE TO ALL CONGRESS PARTICIPANTS

Those desiring their Congress presentations to appear later as articles in the Journal of the International College of Surgeons, please note:

1. A full copy of the manuscript, together with all illustrations, legends, tabular matter and bibliographic references, should be sent **DIRECT** to the Editorial Office, Journal of the International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois. Manuscripts so submitted will be promptly acknowledged and, on acceptance by the Editorial Board, published as soon after the Congress as possible. The Journal cannot be held responsible for loss, failure of acknowledgment, delay in publication or nonpublication of any manuscript, or any subsidiary material appertaining thereto, which has not been submitted through the official editorial channels.

2. Manuscripts may be submitted in advance of the Congress if desired. When this is done, they should be plainly marked with the name, place and date of the Congress concerned, to guard against premature publication.

3. Manuscripts delivered in person to Congress officials or others for press reportorial use only should be sent by the recipient to the Public Relations Bureau.

These requests are made not only to safeguard the Journal from error but in the best interests of our contributors. To make sure of prompt acknowledgment and efficient handling of your Congress presentation, please send it **DIRECT** to its ultimate destination!

was apparently a product of the cancerised cell. The experimental evidence on which this belief is based is somewhat complicated and is therefore best comprehended by reference to the original papers. One of their main arguments for the existence of the intrinsic factor was that the serum of goats which had been immunised against fowl protein (whole chick embryo) neutralised filtrates of fowl-grown Rous and Fujinami tumours if guinea-pig complement were present but failed to inhibit filtrates of duck-grown Fujinami tumour. Conversely, a filtrate of duck-grown Fujinami tumour was neutralised, in the presence of complement, by an antiserum prepared by immunising goats against duck embryo tissue. These antibodies could be completely removed by absorption with normal embryo tissue. An antiserum prepared against fowl-grown Fujinami tumour tissue was capable, on the other hand, of neutralising tumours grown either in fowls or ducks and it could do this in the absence of complement. Absorption of these tumour-immune sera with embryonic tissue failed to remove the whole of their neutralising properties. Thus the Fujinami filtrate contained one antigenic factor which was constant and one which varied according to whether the tumour was grown in fowls or in ducks. Both of these antigens were considered to be constituents of the infective complex. Many experiments were cited to disprove the view that the results obtained were due to mechanical imprisonment of the tumour agent within floccules of precipitated fowl protein. Perhaps the most striking of these was the demonstration that active protein-free eluates of the tumour agent were also neutralised by goat anti-fowl sera.

One objection to these experiments is that crude tumour filtrates, containing a variable amount of fowl protein in addition to the tumour agent itself, were employed both in the preparation of the anti-tumour sera and in the neutralisation tests. The employment of tumour agent free from admixture with fowl protein for both of these purposes would obviously be a considerable improvement and experiments on these lines were accordingly undertaken.

In all the experiments now to be described the purified tumour agent suspensions were tested for the presence of fowl protein by incubating them at 37° C and 45° C with varying dilutions of rabbit anti-fowl sera. In such mixtures no flocculation was observed, irrespective of whether guinea-pig complement was present or not, whereas the same antisera when incubated with crude tumour filtrates or extracts invariably produced a heavy flocculation.

Neutralisation of tumour agent by anti-fowl sera. Potent anti-fowl sera were obtained from 3 rabbits by inoculating them with whole blood of normal brown leghorn fowls. The serum of each



Left to right: Dr. A. N. Goldsmith (seated), Dr. McIntire, and Dr. Simon, who is presenting Dr. McIntire with a Christmas gift.

**3:00-3:45 P.M.—Panel—PROBLEMS IN
OBSTETRICS AND GYNECOLOGY**

Moderator: Martin L. Stone, M.D., F.A.C.S.,
F.I.C.S., New York, N. Y.

William C. Gillick, M.D., F.A.C.S., F.I.C.S.,
Niagara Falls, N. Y.

Edward Kahn, M.D., F.I.C.S., Queens Village,
N. Y.

R. M. H. Power, M.D., F.A.C.S., F.I.C.S.,
Montreal, Canada

John F. Rogers, M.D., F.A.C.S., F.I.C.S.,
Poughkeepsie, N. Y.

Joseph F. Rooney, M.D., F.A.C.S., F.I.C.S.,
New York, N. Y.

George J. Stream, M.D., F.A.C.S., F.I.C.S.,
Montreal, Canada

**3:45-4:30 P.M.—Panel—DIFFICULT
FRACTURE PROBLEMS**

Moderator: Henry Milch, M.D., F.A.C.S.,
F.I.C.S., New York, N. Y.

Otto C. Hudson, M.D., F.A.C.S., F.I.C.S.,
Hempstead, N. Y.

Herbert A. Laage, M.D., F.A.C.S., F.I.C.S.,
New York, N. Y.

Joseph E. Milgram, M.D., F.A.C.S., F.I.C.S.,
New York, N. Y.

Anthony J. Pisani, M.D., F.A.C.S., F.I.C.S.,

New York, N. Y.

Saul Ritchie, M.D., F.A.C.S., F.I.C.S.,
Kingston, N. Y.

4:30-4:40 P.M.—INTERMISSION

**4:40-5:10 P.M.—Paper—SURGICAL TREAT-
MENT OF UTERINE AND VAGINAL
PROLAPSE (with colored film)**

Charles Thom, M.D., F.A.C.S., F.I.C.S.,
Staten Island, N. Y.

Discussion: Victor A. Bacile, M.D., F.A.C.S.,
F.I.C.S., Poughkeepsie, N. Y.

SATURDAY, JUNE 1, 1957

Morning Session

Presiding: Joseph F. Rooney, M.D., F.A.C.S.,
F.I.C.S., New York, N. Y.

Secretaries: Benjamin Lipton, M.D., F.A.C.S.,
F.I.C.S., Poughkeepsie, N. Y.

Cl

S.
Hos-

**8:00-8:30 A.M.—SURGICAL EXPLORATION
FOR OBSCURE MASSIVE UPPER GAS-
TROINTESTINAL HEMORRHAGE**

(colored film)

J. E. Dunphy, M.D., F.A.C.S., Boston, Mass.,

The method of performing the neutralisation tests was as follows. Into each of 4 tubes was placed one volume of a freshly prepared tumour agent suspension and one volume of guinea-pig complement of predetermined activity. One volume of undiluted anti-fowl serum was then added to the first tube, the second received one volume of the same serum diluted 1/10, the third one volume of undiluted normal rabbit serum and the fourth one volume of normal rabbit serum diluted 1/10. After incubation for 1 or 2 hours at 37°C 0.5 c.c. of each mixture was inoculated into young chickens in the usual manner. The importance of the question at issue justifies the giving of the results in detail. Some representative protocols are given in table III, p. 157.

Altogether 19 different samples of anti-fowl sera were tested in this manner and all were found to neutralise Rous suspensions.

TABLE IV

The effect of preliminary incubation on the tumour producing activity of mixtures of anti fowl serum and purified tumour agent suspension

Site	Inoculum	Fowl 504	Fowl 505	Fowl 506
R breast	Rous T A S + complement + anti fowl serum A 1 1	++++	+++	Nil
R leg	Rous T A S + complement + anti fowl serum A 1 10			
L breast	Rous T A S + complement + anti fowl serum A 1 1	Nil	+	Nil
L leg	Rous T A S + complement + anti fowl serum A 1 10			
		Fowl 507	Fowl 508	Fowl 509
R breast	Rous T A S + complement + anti fowl serum B 1 1	+++	++	+++
R leg	Rous T A S + complement + anti fowl serum B 1 10			
L breast	Rous T A S + complement + anti fowl serum B 1 1	Nil	+	+
L leg	Rous T A S + complement + anti fowl serum B 1 10			
		Fowl 510	Fowl 511	Fowl 512
R breast	Rous T A S + complement + anti fowl serum C 1 1	++++	++++	+++
R leg	Rous T A S + complement + anti fowl serum C 1 10			
L breast	Rous T A S + complement + anti fowl serum C 1 1	+	+	Nil
L leg	Rous T A S + complement + anti fowl serum C 1 10			

T A S = purified tumour agent suspension. The plus signs indicate the size of the tumours at the time of death. The anti fowl sera used were samples obtained after the 11th immunising dose.

MUSSIO, JOHN G., M.D., F.I.C.S., D.I.B.S., Brooklyn, N. Y.
Associate Professor
York Medical
Cynecologist at
Fifth Avenue

NAGAMATSU, GEORGE R., M.D., F.A.C.S., F.I.C.S., New York, N. Y.
Diplomate of the American Board of Urology; Professor of Urology, New York Medical College.

NASH, C. STEWART, M.D., F.A.C.S., F.I.C.S., Rochester, N. Y.
Instructor, University of Rochester School of Medicine (Rochester, N. Y.).

NEGRIN, JUAN JR., M.D., F.I.C.S., New York, N. Y.
Assistant Professor of Surgery, New York Metropolitan Medical College
Bellevue and Lenox

NOBLE, ALLEN B., M.D., Montreal, Canada.
Assistant Professor of Anesthesiology, McGill University; Chief, Department of Anesthesia, Royal Victoria Hospital (Montreal, Canada).

PALMER, SECORD, M.D., D.P.H., Brooklyn, N. Y.
Assistant Director, Brooklyn State Hospital.

PARLOW, ALLAN L., M.D., Rochester, N. Y.
Diplomate of the American Board of Urology, Assistant Professor of Urology (Rochester Medical School).

PERKEL, LOUIS, M.D., F.A.C.P., Jersey City, N. J.
Professor of Gastroenterology, Seton Hall Medical College (Jersey City, N. J.); Attending Gastro-Enterologist, Jersey City Medical Center.

PISANI, ANTHONY J., M.D., F.A.C.S., F.I.C.S., New York, N. Y.
Chief Orthopedic Surgeon, St. Vincent's Hospital (New York City); Associate Orthopedic Surgeon, Bellevue.

POWER, DAVID J., M.D., F.R.C.P. (C), F.A.R.C.S. (ENG.) Montreal, Canada.
Seasonal Lecturer of Anatomy, McGill Assistant, St. Mary's Memorial Hospital.

POWBR, DAVID J., M.D., F.R.C.P. (C), F.A.R.C.S. (END.) Montreal, Canada.

RECIO, FABRICIO M., M.D., F.P.C.S., F.A.C.S., F.I.C.S., Manila, Philippines.

Regent, Philippine College of Surgeons.

RAINEY, JOHN J., M.D., F.A.C.S., F.I.C.S., Troy, N. Y.
Consultant Otolaryngologist, St. Mary's McDevlin Memorial.

RIPSTEIN, C. B., M.D., F.A.C.S., F.I.C.S., Brooklyn, N. Y.
Professor of Surgery, Einstein Medical College (New York City).

RITCHIE, SAUL, M.D., F.A.C.S., F.I.C.S., Kingston, N. Y.
Attending Orthopedic Surgeon, Benedictine, Kingston and Uster Co. Tuberculosis Hospitals (Kingston); Consultant Northern Dutchess Health Center (Rhinebeck); Memorial of Creene County (Catskill); Margaretville Hospital (Margaretville); Malmonides Hospital (Liberty); Civilian Consultant, Station Hospital (West Point 1948).

RIVER, LOUIS P., M.D., F.A.C.S., F.I.C.S., Oak Park, Ill.
Diplomate, American Board of Surgery, Clinical Professor of Surgery, Stritch School of Medicine of Loyola University; Professor of Surgery, Cook County Post Graduate Medical School.

ROGERS, JOHN F., M.D., F.A.C.S., F.I.C.S., Poughkeepsie, N. Y.

Diplomate, American Board of Obstetrics and Gynecology; Attending Gynecologist and Obstetrician, St. Francis and Vassar Brothers Hospitals (Poughkeepsie); Consulting Obstetrician and Gynecologist, Northern Dutchess Hospital (Rhinebeck).

ROONEY, JOSEPH F., M.D., F.A.C.S., F.I.C.S., D.I.C.S., New York, N. Y.

President-Elect, New York State Section of International College of Surgeons; Instructor, New York Medical College; Assistant Attending Gynecologist, Flower-Fifth Avenue Hospital.

ROSSER, CURTICE, M.D., F.A.C.S., F.I.C.S., Dallas, Texas.
Diplomate, American Board of Proctology Surgery; Professor and Head, Department of Proctology, Southwestern Medical College; Chief, Proctologic Staff City County Hospitals; Proctologist, Baylor University Hospital; President, United States Section of International College of Surgeons.

RUSSELOT, L. N., M.D., F.A.C.S., New York, N. Y.
Clinical Professor of Surgery, New York University Medical College; Director of Surgery, St. Vincent's Hospital (New York City).

SAUER, JOHN J., M.D., F.A.C.S., F.I.C.S., New York, N. Y.
Assistant Ophthalmologist, Lenox Hill; Consulting Ophthalmologist, U. S. Public Health Service (New York City) and St. Francis (Port Jervis); Ophthalmologist, Willard Parker and French Hospitals.

SCHERR, HENRY M., M.D., F.A.C.S., F.I.C.S., New York, N. Y.

Clinical Professor, New York Polyclinic Hospital; Consultant, Gouverneur Hospital.

SCHERR, ALAN A., M.D., F.A.C.S., F.I.C.S., D.O.L., New York, N. Y.
Assistant Attending Surgeon, Manhattan E.E.N.T.; Assistant Surgeon, Otolaryngology, Assistant Clinical Professor of Otolaryngology, New York University Medical School.

SCHUMACHER, GEORGE, M.D., F.I.C.S., New York, N. Y.
Professor, Neurology, Vermont University Medical School; Formerly Director of Neurological Service, Bellevue Hospital, 2nd Division, Cornell University Medical School.

SEED, LINDON, M.D., F.I.C.S., Chicago, Ill.

Diplomate, American Board of Surgery; Associate Professor of Surgery, University of Illinois Medical School, Surgical Staff, Oak Park Hospital.

SIMON, MAX MICHAEL, M.D., F.A.C.S., F.I.C.S., Poughkeepsie, N. Y.

Attending Surgeon, St. Francis Hospital; Consulting Surgeon, Highland and Matteawan Hospitals (Beacon); President, New York State Section of International College of Surgeons.

SIMON, SAMUEL, M.D., F.A.C.S., F.I.C.S., Poughkeepsie, N. Y.

Diplomate of the American Board of Urology; Director, Urology, Vassar Brothers Hospital; Associate Attending Urologist, St. Francis Hospital; Attending Urologist, Hudson River State Hospital, Consulting Urologist, Northern Dutchess Health Center and Highland Hospital.

STONE, MARTIN L., M.D., F.A.C.S., F.I.C.S., New York, N. Y.

Professor and Director, Department of Obstetrics and Gynecology, New York Medical College and Flower-Fifth Avenue Hospitals (New York City).

STRAUSS, ALFRED, M.D., F.A.C.S., F.I.C.S., Chicago, Ill.
Sr. Attending Surgeon, Michael Reese and Mt. Sinai Hospitals; Attending Surgeon, Franklin Blvd. Community and Louis A. Weiss Memorial Hospital (1922).

STREAN, GEORGE J., M.D., F.A.C.S., F.I.C.S., Montreal, Canada.

Assistant Professor, McGill; Department Director, Jewish Hospital.

TARLOW, ISIDORE, M.D., F.A.C.S., F.I.C.S., New York, N. Y.

Director of Surgery, New York Medical College, Hospital (New York City).

TAUSEND, N. Y.

THEIS, FRANKLYN B., M.D., F.A.C.S., F.I.C.S., D.O., Nyack, N. Y.

Director, E.E.N.T., Nyack, N. Y.

THOM, CHARLES, M.D., F.A.C.S., F.I.C.S., Staten Island, N. Y.

Diplomate, American Board of Obstetrics and Gynecology; Director of Obstetrics and Gynecology, St. Vincent's Hospital (Staten Island).

THOMPSON, SAMUEL A., M.D., F.A.C.S., F.I.C.S., D.A.B., New York, N. Y.

Associate Professor, New York Medical College (New York City); Director, Thoracic Surgery Service, Metropolitan Hospital (New York City); Municipal Sanitarium (Olivette); Attending Surgeon, St. Clare's, St. Anthony's Riker's Island Hospitals; Consultant, St. Joseph's Hospital for Diseases of the Chest (New York City); Paterson General Hospital (Paterson, N. J. 1929).

THOREK, MAX, M.D., F.S.C.D., L.L.D., F.B.C.S., F.I.C.S., F.P.C.S. (Hon.) F.R.S.M., Chicago, Ill.

Founder and General Secretary, International College of Surgeons; Professor of Surgery, Cook County Graduate School of Medicine; Surgeon-in-Chief, American Hospital (Chicago). SPEAKER AT THE BANQUET.

TOOMEY, JAMES J., M.D., F.A.C.S., F.I.C.S., Poughkeepsie, N. Y.

Diplomate of the American Board of Urology; Director, Surgery and Urology, St. Francis Hospital, Consultant, Harlem Valley State Hospital (Wingdale); Hudson River State and Vassar Brothers Hospitals (Poughkeepsie).

TRAVIS, WILLIS, M.D., F.I.C.S., Poughkeepsie, N. Y.
Associate Attending Ophthalmologist, St. Francis and Vassar Brothers Hospitals.

WAULINGFORD, ARTHUR J., M.D., F.A.C.S., F.I.C.S., Albany, N. Y.

Professor of Gynecology and Director of Obstetrics and Gynecology, Albany Medical College and Hospital; Gynecologist, Brady Hospital, Chief Gynecologist, A.

The only outstanding difference between the present experiments and those of Gye and Purdy is the use of purified tumour agent suspensions in place of crude tumour filtrates. The difference in the results obtained apparently depends upon this factor, because

TABLE V

Neutralisation of a Rous tumour agent suspension by anti fowl sera in the absence of complement

Site	Inoculum	Fowl 447	Fowl 448	Fowl 449
R B	Rous T A S +fresh guinea pig serum +anti fowl serum A undiluted	Nil	Nil	Nil
R L	Rous T A S +fresh guinea pig serum +anti fowl serum A diluted 1 10	++	++++	++
L B	Rous T A S +inactivated guinea pig serum +anti fowl serum A undiluted	Nil	Nil	Nil
L L	Rous T A S +inactivated guinea pig serum +anti fowl serum A diluted 1 10	+	+++	+
		Fowl 450	Fowl 451	Fowl 452
R B	Rous T A S +fresh guinea pig serum +anti fowl serum B undiluted	Nil	Nil	Nil
R L	Rous T A S +fresh guinea pig serum +anti fowl serum B diluted 1 10	++	++	++
L B	Rous T A S +inactivated guinea pig serum +anti fowl serum B undiluted	Nil	Nil	Nil
L L	Rous T A S +inactivated guinea pig serum +anti fowl serum B diluted 1 10	++	+	Nil
		Fowl 453	Fowl 454	Fowl 455
R B	Rous T A S +fresh guinea pig serum +anti fowl serum C undiluted	Nil	Nil	Nil
R L	Rous T A S +fresh guinea pig serum +anti fowl serum C diluted 1 10	Nil	+++	Nil
L B	Rous T A S +inactivated guinea pig serum +anti fowl serum C undiluted	Nil	Nil	Nil
L L	Rous T A S +inactivated guinea pig serum +anti fowl serum C diluted 1 10	Nil	++	Nil

T A S = purified tumour agent suspension. The plus signs indicate the size of the tumours at the time of death. The anti fowl sera used were samples obtained after the 8th immunising dose.

the same anti-sera which were used in the above experiments produced only partial and irregular neutralisation of crude tumour extracts when complement was omitted from the mixtures yet they neutralised the same tumour extracts efficiently when fresh guinea-pig serum was added.

Surgical Management of

Draining Nipple12:20-12:40 p.m.

George N. Bates, M.D., F.A.C.S., F.I.C.S.,
D.A.B., Active Surgical Staff, St. Vincent,
St. Charles and Maumee Valley Hospitals;
Courtesy Surgical Staff, Mercy and Toledo
Hospitals, Toledo, Ohio

Incubation Period in Bronchogenic

Carcinoma12:40-1:00 p.m.

Edward C. Lawless, M.D., Columbus, Ohio

Wednesday, April 10, 1957

Presiding:

J. Duane Miller, M.D., F.A.C.S., F.I.C.S.,
D.A.B., Regent of Michigan, Grand Rapids,
Michigan.

Secretary:

Gilman D. Kirk, M.D., F.A.C.S., F.I.C.S.,
D.A.B., Regent of Ohio, Columbus, Ohio

Tumors of the Neck9:00-9:20 a.m.

Arnold S. Jackson, M.D., F.A.C.S., F.I.C.S.,
D.A.B., Director, Jackson Clinic, Madison,
Wisconsin

**Management of Subcapital Fractures of the
Hip by Transfixion**9:20-9:40 a.m.

Frederick James Krueger, M.D., F.A.C.S.,
F.I.C.S., D.A.B., Assistant Clinical Professor,
Orthopedic Surgery, Marquette University,
Milwaukee, Wisconsin

Benign Neoplasms of the

Stomach9:40-10:00 a.m.

Edmund W. Schacht, M.D., F.A.C.S., F.I.C.S.,
Chairman, Surgical Service, St. Luke's Hos-
pital, Racine, Wisconsin

Fractures of the Ankle10:00-10:20 a.m.

George J. Garceau, M.D., F.I.C.S., D.A.B.,
Professor and Chairman, Department of
Orthopedic Surgery, Indiana University Med-
ical School, Indianapolis, Indiana

A Method of Surgical Treatment of

**Urethral Stricture Not Amenable
to Dilatation**10:20-10:40 a.m.

Avrom M. Isaacs, M.D., F.A.C.S., D.A.B.,
Clinical Instructor of Surgery, Department
of Urology, University of Louisville School
of Medicine, Louisville, Kentucky

Intermission10:40-11:00 a.m.
Panel

Thyroid Diseases11:00-12:00 M.

Moderator: Arnold S. Jackson, M.D., F.A.C.S.,
F.I.C.S., D.A.B., Director, Jackson Clinic,
Madison, Wisconsin

William O. Johnson, M.D., F.A.C.S., D.A.B.,
Professor of Gynecology and Head of the
Combined Departments of Gynecology and
Obstetrics, University of Louisville School
of Medicine, Louisville, Kentucky

Claude J. Hunt, M.D., F.A.C.S., F.I.C.S.,
D.A.B., Former Chairman, Research and

Kansas City Municipal Hospitals; Surgeon,
Research Hospital, St. Mary's Hospital,
Menorah Hospital, Surgical Section Research
Clinic; Chairman of Trustees, United States
Section, International College of Surgeons,
Kansas City, Missouri
Lindon Seed, M.D., F.I.C.S., D.A.B., Clinical
Associate Professor of Surgery, University
of Illinois College of Medicine; Surgical Staff
and Director of Isotope Laboratories, Augus-
tana Hospital, Chicago, Illinois

The Complications of Cataract Surgery

and Their Management ..12:00-12:20 p.m.

Richard C. Troutman, M.D., F.A.C.S., D.A.B.,
Professor of Ophthalmology, Department of
Surgery, State University of New York,
Brooklyn, New York

Menstruation: Its Physiology and

Abnormalities12:20-12:40 p.m.

Gilbert F. Douglas, M.D., F.A.C.S., F.I.C.S.,
D.A.B., Associate Professor of Gynecology,
Department of Gynecology, Medical College
of Alabama, Birmingham, Alabama

Surgical Treatment of Inguinal Hernia, with Particular Reference to

Recurrences12:40-1:00 p.m.

W. M. McMillan, M.D., F.A.C.S., F.I.C.S.,
D.A.B., Professor of Surgery, Cook County
Graduate School; Assistant Professor of Sur-
gery, Northwestern University, Chicago, Illi-
nois

The General Chairmen of the Woman's
Auxiliary for the French Lick meeting are
Mrs. Arnold S. Jackson, Madison, Wisconsin;
Mrs. Leon Gray, Martinsville, Indiana, and
Mrs. Elbert L. Dennis and Mrs. Karl Winter,
Louisville, Kentucky. The Co-Chairmen are
Mrs. Ben A. Reid, Mrs. J. Andrew Bowen and
Mrs. Joseph C. Ray, Louisville, Kentucky;
Mrs. Paul Haley, South Bend, Indiana, and
Mrs. George Garceau, Mrs. Phillip Holland,
Mrs. Eugene Newland and Mrs. Simon Reisl-
er, Indianapolis, Indiana.

A cordial invitation is extended to mem-
bers of the surgical and allied professions,
their families and guests to attend.

Advance registration Sunday, April 7
in the Lobby from 10:00 a.m. to 12:00
noon and from 2:00 p.m. to 4:00 p.m. Reg-
istration fee \$5.00 for members and visit-
ing physicians. No charge for residents,
interns, nurses and the Military.

Women's registration in the Lobby. Fee
\$5.00.

Discussion

The evidence here put forward is sufficient to justify a full acceptance of the fact that the tumour-exciting agents of the Rous and Fujinami sarcomata can be precipitated by means of the high-speed centrifuge. The interpretation of this fact, however, still allows room for speculation. It may be argued that the centrifuge only effects the deposition of minute fragments of the cell protoplasm upon which the tumour agent, itself non-particulate, is adsorbed. Against this theory may be set the following experimental facts. The various procedures employed in the preparation of a tissue extract disintegrate the cells into fragments of widely varying size. This is shown by the fact that fresh deposits are obtained from a tissue extract or filtrate with every increase in the centrifugal force applied to it. If the tumour agent were merely adsorbed on cell fragments it should be expected that part of the agent would be found in the deposit obtained with a centrifugal force of, say, 5000 times gravity, another fraction would be deposited with a force of 8000 times gravity and so on. Experiment indicates, however, that this is not the case: a force of at least 10,000 times gravity is required to produce any measurable amount of sedimentation of the agent. Similarly, if this hypothesis were correct the whole of the tumour agent would not be deposited by a force of 20,000 to 30,000 times gravity, since particles of extremely minute size can still be seen, by dark-ground examination, in the supernatant fluid resulting from this procedure. The results therefore indicate that the agent itself or the particles to which it is attached are fairly uniform in size, a fact which is confirmed by the filtration studies of Elford and Andrewes. Again, it has been suggested that cell granules, which are present in the cytoplasm of malignant and normal cells alike, are the structures on which the tumour agent is adsorbed. This theory appears to be discounted by the fact that suspensions of such granules prepared from chicken leucocytes and other tissues are strongly agglutinated by an anti-fowl serum, whereas the particles present in a purified tumour agent suspension are unaffected by such a serum. Finally there is the suggestion put forward by some workers that the so-called virus elementary bodies are a result of the interaction of the infected cell and the virus, the latter being itself non-particulate and remaining within this reaction product. Such a suggestion lies at present wholly within the realms of speculation and its adoption appears to serve no useful purpose, since the elementary body and its hypothetical virus remain inseparable. A similar claim might be made, as Eagles and Ledingham have pointed out, for any recognised organism such as the *Bact typhosum*.

Woman's Auxiliary

United States and Canadian Sections, International College of Surgeons

REPORT OF PROGRESS



Mrs. Clifton L. Dance

Our committees have been diligently at work since the last meeting of the Board of Directors, and I take this opportunity to acquaint you with the personnel and work of our committees and our officers.

Ladies' Entertainment Committee.

Mrs. Clement L. Martin, Chairman.—Mrs. Martin is already at work, planning the entertainment for the next annual Congress. In a great metropolis like Chicago, plans and reservations must be made far in advance. With Mrs. Martin at the helm, we may be sure of delightful surprises.

Constitution and By-Laws Committee, Mrs. DeLoise H. Downey, Chairman.—Mrs. Downey, who is richly endowed for this task, reports good progress. The work requires vision to see ahead for the steady growth of the Auxiliary and a balanced judgment for the practical. Each point must be considered and then reconsidered from a point of law.

Historian, Mrs. Henry W. Meyerding.—Mrs. Meyerding is particularly well qualified for the important post of recording for posterity. She is a charter member of the Woman's Auxiliary. Her husband is a past president of the United States Section of the International College of Surgeons, and both are conversant with every important event in the history of the College.

Membership Committee, Mrs. Floyd E. Keir, Chairman.—This is a year-round job,

and we are fortunate in having for our chairman Mrs. Keir, who attends a good many of the Regional Meetings and often acts as our Representative at Large.

Memorial Fund Committee, Mrs. Donald L. Dickerson, Chairman.—Mrs. Dickerson is also a charter member and is a constant, devoted worker for the Memorial Fund among her many other activities.

Public Relations, Mrs. Charles W. Weigel.—This is a post that requires a dash of imagination, as our Auxiliary is still in its infancy. We are, however, growing fast, and this growth will furnish really worth-while material in due time.

Printing Committee, Mrs. Jerome J. Moses, Chairman.—Mrs. Moses has the double duty of placing orders for all printed matter and then seeing that the proper committees and officers are supplied with the printed matter they need.

Hall of Fame and School of the History of Surgery, Mrs. Chester W. Trowbridge, Chairman.—This is a comparatively new committee, appointed with the advent of the School of the History of Surgery. This school, unique in the annals of surgery, is located in the International Surgeons' Hall of Fame and offers a series of lectures by outstanding authorities and scholars in surgical history. Mrs. Trowbridge and her committee serve as hostesses at these lectures, and as might have been expected of such a genuinely hospitable person, Mrs. Trowbridge has come up with a set of recommendations to make the lectures more accessible and comfortable for the audience.

Archives Committee.—This committee is in the process of being set up. A chairman and cabinet will be appointed.

bodies prepared from lapine. On account of this property alone the avian sarcoma agents must remain in a class of their own.

At the present time cancer research is proceeding rapidly along several well defined lines. The study of the synthetically produced carcinogenic substances is yielding information of great importance and the recently established connection between oestrogenic and carcinogenic activity has opened up a new field of investigation. With the exception of the work of McIntosh (1933) on the filterability of tar-induced tumours in fowls there is at present no connecting link between the virus concept of new growth and these other lines of enquiry. It must be emphasised, however, that the discoveries made in these different fields are not necessarily antagonistic. The final solution of the problem of the causation of malignant growths both of birds and mammals must take count of the discoveries made in each of these at present separate fields.

Conclusions

1 A centrifugal force of 20,000 to 30,000 times the force of gravity will deposit the whole of the tumour-exciting agent from highly active cell-free extracts of the Rous no. 1 and the Fujinami sarcomata.

2 By employing the method of repeated fractional centrifugation it is possible to prepare highly active suspensions of these tumour agents which are apparently free from fowl protein.

3 Microscopic examination of these purified suspensions reveals the presence of large numbers of particles of fairly uniform size and appearance which are below the limits of optical resolution. The available evidence suggests that the tumour agents exist in the form of these particles, which are of the nature of virus elementary bodies.

4 These purified tumour agent suspensions are specifically agglutinated by the sera of fowls bearing the corresponding tumour. This reaction, however, cannot always be demonstrated. Some degree of cross agglutination occurs between Rous and Fujinami suspensions and the corresponding antisera.

5 Agglutinins for both Rous and Fujinami tumour agent suspensions can frequently be demonstrated in the serum of apparently normal adult fowls but not in normal young chickens.

6 Sera which show a strongly positive agglutination reaction also contain neutralising antibodies for the tumour agents.

7 Purified tumour agent suspensions which are apparently free from fowl protein are still neutralised by hyperimmune rabbit anti-fowl sera. The presence of complement does not appear to be essential for this reaction. From this finding it is inferred

3:00 p.m. *The Nailing of Fractures of the Lower Extremities*

Prof. Max Herzog, Krefeld

3:30 p.m. *The Osteosynthesis of Fractures*

Prof. Charles Mirallié, Nantes

4:00 p.m. Discussion of the reports presented.

4:30 p.m. *Infiltration Anesthesia and Operative Section of the Pudendal Nerve for Pelvic Pain*

Prof. Raymond Darget, Bordeaux

5:00 p.m. Motion picture on the treatment of fractures (in color).

7:30 p.m. Official reception and banquet.

Sunday, April 7

9:45 a.m. *Electrolytes: General Considerations*

Prof. Hamburger, Paris

10:15 a.m. *Postoperative Thrombosis and Embolism: Personal Conceptions*

Dr. Marc Iselin, Paris

10:45 a.m. *Personal Researches on Thrombosis*

Drs. J. Stalport and Edouard E. M.

Nicolas, Huy

11:30 a.m. *Emergency Embolectomy of the Lower Extremity: Report of Three Cases*

Dr. G. Lambert, Seraing

COLOMBIAN SECTION

From Dr. Antonio Ordóñez Plaja, F.I.C.S., Secretary of the Colombian Section of the International College of Surgeons, comes the news that the Colombian Section, following the example of the Col-

lege, has sent the sum of \$1,000 to the Comité Pro-Hungria as a gift from the Section. The gift was granted at the Club Medico of Bogota on Dec. 24, 1956.

"We count it the greatest satisfaction,"



Left to right, Dr. Giuseppe Figlioli; Prof. Dr. César A. Pantoja, F.I.C.S., Member of the Executive Council, Colombian Section, and of the International Board of Governors; Prof. Dr. Pedro Eliseo Cruz, F.I.C.S., President of the Colombian Section and of the Colombian Association of Surgeons; Sra. de Rosenberg of the Comité Pro-Húngaros Libres, and Dr. Antonio Ordóñez Plaja, F.I.C.S., Secretary of the Colombian Section.

bodies prepared from lapine. On account of this property alone the avian sarcoma agents must remain in a class of their own.

At the present time cancer research is proceeding rapidly along several well defined lines. The study of the synthetically produced carcinogenic substances is yielding information of great importance and the recently established connection between oestrogenic and carcinogenic activity has opened up a new field of investigation. With the exception of the work of McIntosh (1933) on the filterability of tar-induced tumours in fowls there is at present no connecting link between the virus concept of new growth and these other lines of enquiry. It must be emphasised, however, that the discoveries made in these different fields are not necessarily antagonistic. The final solution of the problem of the causation of malignant growths both of birds and mammals must take count of the discoveries made in each of these at present separate fields.

Conclusions

1 A centrifugal force of 20,000 to 30,000 times the force of gravity will deposit the whole of the tumour-exciting agent from highly active cell-free extracts of the Rous no. 1 and the Fujinami sarcomata.

2 By employing the method of repeated fractional centrifugation it is possible to prepare highly active suspensions of these tumour agents which are apparently free from fowl protein.

3 Microscopic examination of these purified suspensions reveals the presence of large numbers of particles of fairly uniform size and appearance which are below the limits of optical resolution. The available evidence suggests that the tumour agents exist in the form of these particles, which are of the nature of virus elementary bodies.

4 These purified tumour agent suspensions are specifically agglutinated by the sera of fowls bearing the corresponding tumour. This reaction, however, cannot always be demonstrated. Some degree of cross agglutination occurs between Rous and Fujinami suspensions and the corresponding antisera.

5 Agglutinins for both Rous and Fujinami tumour agent suspensions can frequently be demonstrated in the serum of apparently normal adult fowls but not in normal young chickens.

6 Sera which show a strongly positive agglutination reaction also contain neutralising antibodies for the tumour agents.

7 Purified tumour agent suspensions which are apparently free from fowl protein are still neutralised by hyperimmune rabbit anti-fowl sera. The presence of complement does not appear to be essential for this reaction. From this finding it is inferred

Mar. 15—*Anorectal Abscesses and Fistulas*

Dr. Lino Torre

Malignant Tumors of the Rectosigmoid:

Diagnosis and Operative Treatment

Dr. J. Soler-Roig

Mar. 18—*Modern Concepts of Hepatic*

Anatomy: Indications and Technic of

Hepatectomy

Dr. A. Sitges

Mar. 20—*Surgical Treatment of Hydatid Cyst of the Liver*

Dr. Canals Maynor

Benign and Malignant Tumors of the Liver

Dr. F. Vilardell

Mar. 22—*General Physiopathology of the*

Portal System: Methods of Investigation

(Splenoportographic, Portographic and Manometric)

Drs. A. Modolell and A. Sitges

Mar. 25—*Syndrome of Portal Hypertension: Clinical Types*

Dr. Lino Torre

Mar. 27—*Surgical Treatment of Portal*

Hypertension: Emergency Methods for

Hemorrhage Due to Esophageal Varices:

Indications for Splenectomy and Various

Technics of "Shunt"

Drs. A. Sitges and Lino Torre

Mar. 29—*Surgical Anatomy of the Spleen:*

Operative Approaches and Technic of

Splenectomy: Diagnosis and Treatment of

Splenic Trauma

Dr. Lino Torre

Indications for Surgical Treatment of Hypersplenism

Dr. J. M. Alcover

April 3—*Primary and Parasitic Cysts of the*

Spleen: Benign and Malignant Splenic

Tumors

Dr. A. Moliner

Anatomic Review: Approaches and

Technics for Pancreatectomy:

Embryologic Considerations and Principal

Congenital Anomalies

Dr. A. Sitges

April 5—*Acute Pancreatitis: Pathogenesis,*

Diagnosis and Treatment

Dr. Lino Torre

April 8—*Chronic Recurrent Pancreatitis:*

Definition, Diagnosis and Treatment

Dr. A. Sitges

April 10—*Traumatic Lesions, Fistulas and*

Lithiasis of the Pancreas

Dr. A. Moliner

Cysts and Pseudocysts of the Pancreas

Dr. M. Miserachs

April 12—*Benign and Malignant Tumors of the Pancreas, and Duodenum: Radical and Palliative Operations for Carcinoma in This Region*

Dr. J. Soler-Roig

April 24—*Acute Peritonitis: Pathologic*

Physiology, Clinical Forms and Treatment in General

Dr. Lino Torre

Tuberculous Peritonitis

Dr. I. Serés

April 26—*Nonspecific Mesenteric*

Lymphadenitis and Tuberculosis

Dr. A. Moliner

Retractile Mesenteritis: Cysts and

Tumors of the Mesentery: Epiploic

Pathology (Epiploitis, Torsion, Idiopathic Infarct and Tumors)

Dr. A. Sitges

April 29—*Acute Abdominal Disease: Concept and General Considerations: Criteria and Opportunity for Operation*

Dr. J. Soler-Roig

May 3—*Structural Scheme of the Abdominal Walls with their Orifices and Trajectories: Technic of Laparotomy: Prophylaxis and Treatment of Eventration and Evisceration Following Laparotomy*

Dr. Lino Torre

Abdominal Syndromes of Vascular Origin

Dr. R. E. de Sobregrau

May 6—*Abdominal Contusion: Abdominal and Abdominothoracic Injuries*

Dr. P. Arqué

Postoperative Treatment in Abdominal Surgery

Dr. J. Reventos

May 8—*Inguinoscrotal and Crural Hernia*

Dr. J. Montaner

May 10—*Omphalocele: Umbilical and*

Epigastric Hernias

Dr. R. Balcells

Strangulated Hernia: Types and Surgical Treatment

Dr. J. Montaner

The wide scope of this program and the well-known ability of the lecturers are consonant with the quality of the service offered the College by Prof. Soler-Roig. We are sure that those who are able to take advantage of this fine course will long remember it as a unique scientific experience.

C R AMIES

- SCHLESINGER, B, SIGNY, A G, 1935 *Lancet*, i 1145
 AMIES, C R, AND BARNARD,
 J E
 SITTENFIELD, M J, JOHNSON, 1931 *Amer J Cancer*, xv 2275
 B, AND JOBLING, J W
 TEUTSCHLAENDER, O 1923 *Z Krebsforsch*, xx 43
 TODD, C 1930 *Proc Roy Soc B*, cvi 20
 ZINSSER, H, AND TANG, F F 1927 *J Exp Med*, xlv 357

IN MEMORIAM
ERNEST NOVAK, M.D., F.I.C.S.
1899-1956

Since 1952, when Dr. Ernest Novak became a Fellow of the International College of Surgeons, his real and vital personality has emerged little by little from his many letters. The concept of him as a person casts unreality on the news of his untimely death in West Pakistan on Oct. 18, 1956. The events of his life symbolize the unsettled state of our world, and it is fitting for us to review them in remembering him.

He was born in Kolozsvár, Hungary, on May 15, 1899, and completed his preliminary schooling in the city of his birth. As an extremely young commissioned officer, he saw active service in World War I. After his term of military duty, he began his medical studies at the Medical College of the University of Budapest, where he earned his degree of Doctor of Medicine in 1924.

Between the two world wars, as he related in his letters, he had the good fortune of working for a long period in the clinics of many leading surgeons. His teacher, the ingenious Prof. Verebélyi, sent him for further surgical training to Vienna and Germany. For several years he also studied in the clinics of Gosset, Voronoff and Hartmann in Paris and with Donati in Milan. When Kolozsvár, the capital of Transylvania, once more became part of Hungary, he was named Professor of Operative Surgery.

For eighteen years Dr. Novak worked as a surgeon and teacher of surgery in his native land, contributing nearly a hundred scientific papers to Hungarian and German professional journals and writing six books on various surgical topics.

During World War II he was again drawn into military service. He was surgical advisor to the Hungarian Army and President of its Medical Council. Referring to this period in one of his letters, Dr. Novak said, "We in the army experienced but little from the Nazi regime; we fought against communism and knew why; when the battle for Hungary was lost, we retreated to Germany; the collapse reached me in Halle. . . ."

As a stateless person whose country had collaborated with the Nazis, he was not entitled even to those benefits that were accorded to displaced persons. In the aftermath of war he was assigned to work in a large hospital for displaced persons, serving as Chief Surgeon of the hospital. Three years after the end of the war, he was able to secure a visitor's visa for a short stay in Ireland. Immigration regulations, however, made it impossible for him to make any permanent plans either in Ireland or in England.

He neither wished nor thought it wise to attempt to return to Hungary, which, as he put it, was laboring under a continuation of its thousand-year history of "countless dreadful experiences." He was sure that his country had adopted its political countenance under duress, and fervently hoped that "some happy change" would again permit Hungarians to continue their "national life where we lost it by losing the war." To such a change and to such a time he looked forward.

- SCHLESINGER, B , SIGNY, A G , 1935 *Lancet*, i 1145
AMIES, C R , AND BARNARD,
J E
SITTENFIELD, M J , JOHNSON, 1931 *Amer J Cancer*, xv 2275
B , AND JOBLING, J W
TEUTSCHLAENDER, O 1923 *Z Krebsforsch* , xx 43
TODD, C 1930 *Proc Roy Soc B* , cvi 20
ZINSSER, H , AND TANG, F F 1927 *J Exp Med* , xlv 357

Relationship Between Anchoring Sutures and the Pancreatic Duct: To acquire a better understanding, the pancreas may be divided in the following manner (Fig. 1): First, assuming the adherent portion of this gland with the duodenum to be a zone in subdividing this gland, denoted as C. The portion to the right of portion C, such as the isthmus, the tuber omentale and others, are designated by capital letters D, E, etc., respectively. Anchoring sutures are most commonly placed into portion E, and next commonly into portion D or C. Roentgen studies and measurements of consecutive transections of this gland were done in order to ascertain the precise location of the pancreatic duct. The roentgenogram of the pancreas taken in the ventrodorsal direction revealed that the main duct ran along the middle portion of this gland, meandering to some extent. Another roentgenogram, taken in the craniocaudal direction, revealed that the main duct ran dorsally in the head of this gland (Fig. 2). The needle seen in this picture indicates the site of the anchoring sutures. Consecutive transections used in this study were obtained from the specimen which had been treated with solution of formaldehyde after the injection of red opaque substances into the main duct. Table 2 presents the data on location of the main duct obtained from 12 fresh corpses. It will be noted that the head of the pancreas, portion A and B, is wider, while the isthmus, portion D, is the narrowest. It will be understood also that the main duct runs dorsally in the head of the pancreas and that it is not compromised by these anchoring sutures, placed at most only 2 mm. deep.

b. Histologic Changes: Histologic study was done in both animal and clinical cases in order to pursue the postoperative changes of the pancreas. In experiments on dogs, a consecutive observation was carried out for one week to six months

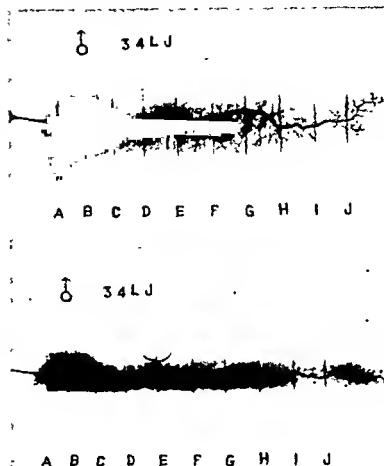


Fig. 1.—Roentgenograms of pancreatic duct. The needle indicates the site of anchoring sutures.

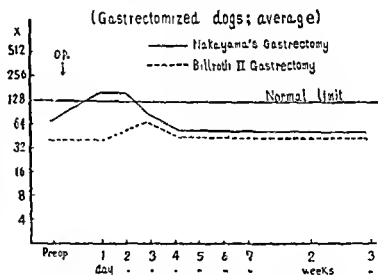


Fig. 2.—Serum amylase concentration.

after operation by this method. Clinical study was also done with patients who died of some complication not involving this gland. This study indicated the following facts: In one week there occurred an adhesion between the gastric and the

malarial drugs, every surgeon in the tropics has to suspect malaria as a cause of fever in newly admitted or postoperative patients. Examination of the thick blood film fortunately indicates the proper diagnosis, and treatment can be instituted at once. I have observed several cases of minor trauma in which, after admission to the hospital, there has been fever and malaria parasites have been present in the blood.

Rupture of the spleen, although rare in British Honduras, still occurs. Splenectomy, performed as early as possible before the catastrophic intraperitoneal hemorrhage has occurred, is a life-saving measure.

Most common, from the surgical point of view, is infestation by worms. It would hardly be an exaggeration to state that the majority of children in tropical countries, if not all, have intestinal worms. These poor children come to the hospital with a great variety of abdominal disturbances, ranging from violent symptoms of acute abdominal disease to mild indigestion and malnutrition. Infestation with *Ascaris lumbricoides* often demands surgical intervention. In my practice in British Honduras I have had to perform several laparotomies on children. They were admitted to the hospital with symptoms of acute obstruction, peritonitis or appendicitis and required emergency operations. In 1 case of obstruction I discovered that this was caused by about 150 live ascarid completely blocking the intestinal lumen. The child was admitted too late and unfortunately died after the operation. Another, a 5-year-old boy, had *Ascaris lumbricoides* in the appendix (Fig. 2). He was admitted to my department with symptoms of acute abdominal disease, a temperature of 100F. and a pulse rate of 140. Laparotomy revealed some free fluid in the abdominal cavity, bluish discoloration of the intestine and the presence of two live ascaridia in the



Fig. 2.—Appendicular obstruction by *A. lumbricoides* (author's case).

appendix. After appendectomy oil of chenopodium mixture was given, and three days later the child passed another ascaris. Convalescence was otherwise uneventful, and the boy was discharged from the hospital twelve days later.

Amebiasis.—Although amebiasis may occur in every country, patients in the tropics usually seek medical aid in the late stages of the disease. The surgeon may encounter cases of colitis, with bleeding ulcerations, or abscess of the liver. The first condition may sometimes cause dangerous bleeding, perforation and peritonitis and calls for emergency laparotomy; the second usually requires aspiration of the abscess. Treatment of either is successful only if supported by emetine or chloroquin. Often on opening the abdomen for peritonitis, I have observed one or more perforated ulcers of the colon. Recovery followed repair of the perforations and the administration of emetine. In 1 case of hepatic abscess (the first I ever encountered), I aspirated several times, removing a total of 3 pints of "chocolate" pus. This aspiration, supported by chloroquin, produced quick recovery.

Malnutrition.—Malnutrition is exceedingly common in the tropics. It is caused not only by an insufficient and unbalanced diet but by poor function of the liver,

can be accepted at their face value, a flask containing originally 250 cc of water would, when 10 cc amounts yielded negative results, contain a total of less than 25 living bacilli from which the

TABLE I

Day	Flask.							
	3	336	113	11	13	8	102.	9
0	300	470	370	19	320	1,000	380	12
1	32	90		33	210	2,000	270	2
2	1	60		57	130	70,000	18,000	1
3	0	50	99	410	84	120,000	150,000	0
4				5,100	450	140,000	190,000	
5		30	48	78,000	20,000		210,000	2
6					190,000	170,000	210,000	
7		29			180,000		170,000	
8		2				83,000		130
9			240	17,000				2,200
10		0			200,000	230	130,000	38,000
11			910	7			58,000	150,000
12			490		37,000	0	5,200	150,000
13				2				
14			110		1,900	0	2,400	
15				0			3,200	6,000
16					450	3		210
17			0	20			27,000	20
18					70	1		9
19							28,000	
20				45	9		25,000	0
21						27	12,000	
22				440	11	86	7,100	0
23						340	420	
24					74	550	260	
25				58,000		15,000		9
26					5 200	67,000		
27				61,000		94,000		52
28						110,000		
29				13,000	110,000		5,500	210
30						120,000		
31				230				
32					48,000			
33				7		25		
34					180			
35				0	0			
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								
51								
52								
53								
54								
55								
56								
57								
58								
59								

large numbers subsequently found would be observed that life is here defined as ability. The possibility of latency, to be excluded by the fact that

There are many theories concerning the cause of this disease, which I shall not mention here. I wish to call attention, however, to the marked incidence of this condition in Negresses. It seems almost to be a racial peculiarity. Can it be due to the racial fibroblastic tendency? Does the condition follow trauma or irritation during their well-known early sexual activity?

4. Another racial disease of the Negro is sickle cell disease,¹ which can cause many pathologic changes in bone marrow, e.g., osteomyelitis or avascular necrosis of the head of the femur. Examination of the blood for sickle cells is advisable in all operative cases, as fatal postoperative complications due to unrecognized sickle cell disease have occurred (Fig. 7).

Malignant Growth.—The most common malignant growth in British Honduras is carcinoma of the cervix. During the first

six months of this year I have observed 26 cases more than I encountered last year. This is a very high figure for a population of 80,000. Many more cases confront other doctors during that time; many more are no doubt lying unnoticed in remote villages.

Some of the patients have been comparatively young women. This is in agreement with recent work at U.C.W.I. by Bras, Stewart, Pinkerton and Miller, which shows that the maximum incidence of carcinoma of the cervix in Jamaica is reached ten years earlier than in the United States and fifteen years earlier than in England (Fig. 8).

In explanation of this early age incidence I am inclined to the opinion that cervical carcinoma tends to appear earlier in women whose sexual activity and childbearing begin earlier. If one accepts the theory that sexual activity and childbearing have a carcinogenic action which "take an average of twenty years to produce its effect" (Maliphant, 1948), one easily finds an explanation of the early age incidence, as it is known that sexual activity and childbearing begin among tropical peoples shortly after puberty.

Treatment of carcinoma of the cervix in some remote places in the tropics is difficult because 1) the patient usually comes to the hospital in an advanced stage of the disease (second, third or fourth), 2) and not all hospitals have facilities for irradiation treatment and the patients are too poor to afford travel abroad. In many cases, therefore, operation alone, no matter how extensive, does not secure a successful result.

Early microscopic diagnosis is the essential factor. In differential diagnosis special attention should be paid to granuloma inguinale and tuberculosis of the cervix which sometimes show similar clinical pictures.

In connection with this disease, I should like to stress the great number of vaginal

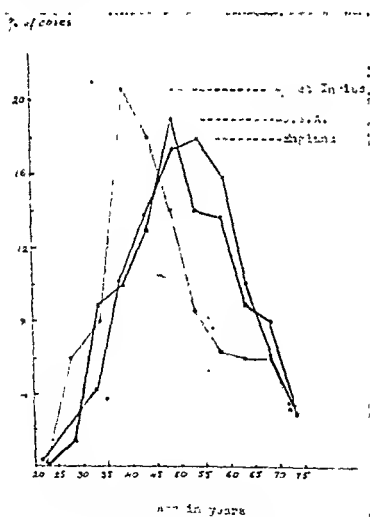


Fig. 8.—Incidence of carcinoma of the cervix in relation to age.

can be accepted at their face value, a flask containing originally 250 c c of water would, when 10 c c amounts yielded negative results, contain a total of less than 25 living bacilli from which the

TABLE I

Day	Flask.							
	3	336	113	11	13	8	102	9
0	300	470	370	19	320	1,000	380	12
1	32	90		33	210	2,000	270	2
2	1	60		57	130	70,000	18,000	1
3	0	50	99	410	84	120,000	150,000	0
4				5,100	450	140,000	190,000	
5		30	48	78,000	20,000		210,000	2
6					190,000	170,000	210,000	
7		29			180,000		170,000	
8		2				83,000		130
9			240	17,000			130,000	2,200
10		0			200,000	230	58,000	38,000
11			910	7				150,000
12			490		37,000	0	5,200	150,000
13				2				
14			110		1,900	0	2,400	
15				0			3,200	6,000
16					450	3		210
17			0	20			27,000	20
18					70	1		9
19							28,000	
20				45	9		25,000	0
21						27	12,000	
22				440	11	86	7,100	0
23						340	420	
24					74	550	260	
26				58,000		15,000		9
27					5,200	67,000		
28				61,000		94,000		52
29						110,000		
30				13,000	110,000		5,500	210
31						120,000		
32				230			590	
33					48,000		150	8,100
34				7		25,000		
35					180		320	73,000
37				0	0	410	3,900	56,000
39						71	3,200	18,000
40							2,600	
41						10		3,300
42							650	
43						0	32	1,700
45							0	170
47								790
49								1,600
51								8,400
55								62
59								0

large numbers subsequently found would be descended. It should be observed that life is here defined as ability to grow in culture media. The possibility of latency is, to some extent at least, excluded by the fact that incubation of many of these negative

Folge eines Zökumkarzinoms berichtet. Ein komplizierender Faktor bestand in einem Kardiospasmus. Wahrscheinlich bestand der Krebs bereits seit mindestens einem Jahr, seine Entdeckung wurde aber wohl durch das gleichzeitige Vorliegen des Kardiospasmus verzögert.

RIASSUNTO

Viene riferito un caso di intussuscezione ileo-cecale in adulto, dovuta ad un carcinoma del ceco e complicata da achalasia dell'esofago. Si ritiene probabile che il carcinoma fosse presente da almeno un anno e che la sua scoperta sia stata ritardata

dalla presenza della achalasia esofagea.

RÉSUMÉ

L'auteur décrit un cas d'invagination iléocoecale chez l'adulte, provoquée par un carcinome du rectum compliqué d'achalasia de l'oesophage. Il est à présumer que le carcinome datait d'un an au moins; son diagnostic a été retardé du fait de la complication oesophagienne.

REFERENCE

1. Brayton, D., and Norris, W. J.: Intussusception in Adults, *Am. J. Surg.* 88:32-43 (July) 1954.

The world at the present day stands in need of two kinds of things. On the one hand, organization—political organization for the elimination of wars, economic organization to enable men to work productively, especially in the countries that have been devastated by war, educational organization to generate a sane internationalism. On the other hand it needs certain moral qualities—the qualities which have been advocated by moralists for many ages, but hitherto with little success. The qualities most needed are clarity and tolerance, not some form of fanatical faith such as is offered to us by the various rampant isms. I think these two aims, the organizational and the ethical, are closely interwoven; given either the other would soon follow. But, in effect, if the world is to move in the right direction it will have to move simultaneously in both respects. There will have to be a gradual lessening of the evil passions which are the natural aftermath of war, and a gradual increase of the organizations by means of which mankind can bring each other mutual help. There will have to be a realization at once intellectual and moral that we are all one family, and that the happiness of no one branch of this family can be built securely upon the ruin of another. At the present time, moral defects stand in the way of clear thinking, and muddled thinking encourages moral defects. Perhaps, though I scarcely dare to hope it, the hydrogen bomb will terrify mankind into sanity and tolerance. If this should happen we shall have reason to bless its inventors.

—Russell

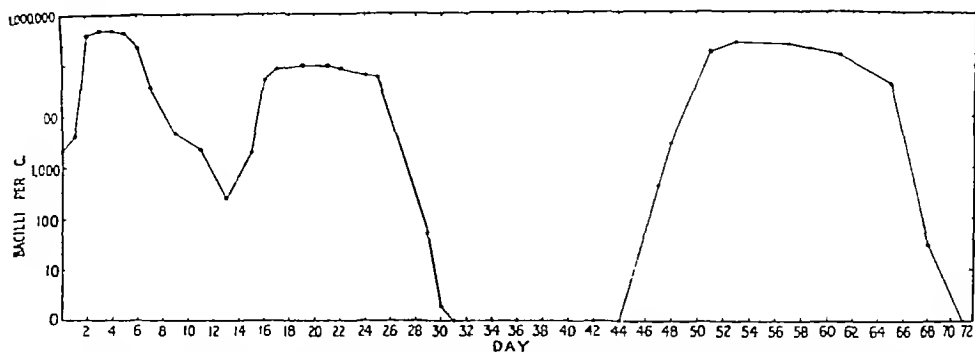


CHART 1—Flask 5, containing 500 c.c. of autoclaved water, inoculated with 2100 bact E per c.c. and kept at 37° C

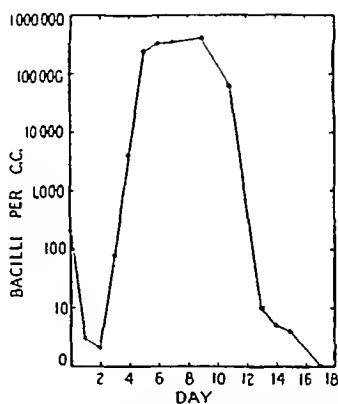


CHART 2—Flask 6, containing 500 c.c. of autoclaved water, inoculated with 210 bact E per c.c. and kept at 37° C

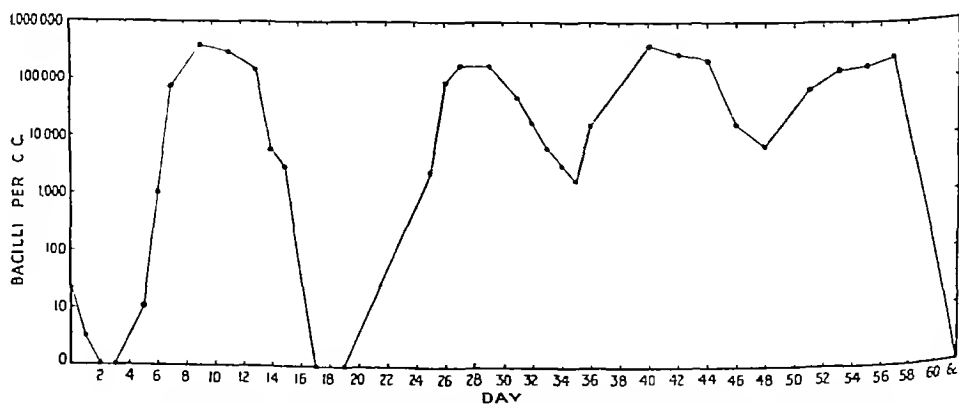


CHART 3—Flask 7 containing 500 c.c. of autoclaved water, inoculated with 21 bact E per c.c. and kept at 37° C

plete urinary incontinence following denervation of the bladder caused by radical hysterectomy and lymphadenectomy. Replacement of the vesical detrusor by an iliac detrusor resulted in almost complete cure.

About a year ago I performed the same plastic operation for substitution in a case of paraplegia following meningomyelitis. The intense dysuria and pollakiuria were corrected, incontinence disappeared during the day but persisted at night.

Two other patients had meningocele with extremely painful vesical symptoms. They were operated on only a few months ago. In 1 the result is excellent during the day but incontinence persists at night; in the other, although I did not obtain a good result, there is great amelioration of the symptoms.

In the last of these 5 patients, whose symptoms were of obscure neurogenic origin, an excellent result was obtained, but the case is too recent for evaluation.

It is my conviction, therefore, that vesical disturbances of neurogenic origin, i.e., those not resulting from contracture of the vesical neck but rather due to faulty function and lack of tone of the detrusor, can in certain instances be cured or improved by ileocystoplasty for substitution. This operation should take its place among operations on the nerves of the bladder. It can complement or replace the denervation operation, which I discarded long ago because of unfavorable results.

5. I attempted to replace the bladder in 3 patients who, after hysterectomy and lymphadenectomy, presented (among other mutilations) advanced vesicovaginal fistula. It was impossible to close the fistula in the contracted and sclerosed bladder by suture. In these cases I resected the bladder, leaving intact the neck and as much as possible of the trigone, with or without reimplantation of the ureters in the iliac loop. Up to the time of writing

I have not had one valid result. Of these 3 patients, 1 died, the condition of 1 was ameliorated, and the case of the third is too recent for evaluation.

6. I performed ileocystoplasty for the following new but questionable indication: The patient presented congenital dysuria. Both transurethral and retropubic resection of the vesical neck had failed, as was evidenced by persistence of dysuria, incontinence and chronic in complete retention of urine in the bladder; the detrusor muscle was enlarged, thickened and atonic. Subtotal cystectomy for removal of the detrusor might have been sufficient, but I complemented it by ileocystoplasty. It is too soon to evaluate results, as the operation was only recently performed.

7. The last 3 cases I shall mention concern ileoplasty for replacement of one or both ureters.

In the first, an operative death resulted; the patient died because of renal insufficiency following replacement of left megaloureter by anastomosis of the ileum to the pelvis and to the bladder (nephrosomy of the right kidney had been previously carried out and the opposite kidney was nonfunctioning).

In the other 2 patients (women) left ureterovaginal fistula and stenosis of the right pelvic ureter had developed after hysterectomy and lymphadenectomy. In these patients I divided both ureters above the iliac vessels and, not being able to dissect them any lower because of sclerosis of the pelvis, implanted them in the branches of a U-shaped iliac loop anastomosed to the bladder at the concave surface. In the first case it became necessary to perform right nephrectomy, as the thin-walled right ureter had been torn during the ureteroiliac anastomosis. Both patients were operated upon less than a year prior to the time of writing. Careful recent clinical and roentgenographic rechecks

TABLE III

	Total.	Positive	Negative
Number of samples	35	25	10
Number of tests	46	34	12

Seventy-one per cent of the samples tested gave growth under these conditions

The number of bacilli inoculated into the water samples did not appear to exercise any definite effect on the result (table IV)

TABLE IV

On inoculation.	Negative result	Positive result.
Under 100	2	7
100 to 400	8	24
Over 400	2	3

The time elapsing between inoculation and the last positive culture in the case of the tests which did not give growth showed considerable differences (table V)

TABLE V

Last day on which positive	Number of times.
0	1
1	3
2	4
4	2
8	2

In 31 of the 34 positive tests the primary peak was determined (table VI)

TABLE VI

Peak.	Number of times
Under 100,000	4
100,000 to 200,000	8
200,000 to 300,000	10
300,000 to 400,000	4
400,000 to 500,000	1
500,000 to 600,000	0
600,000 to 700,000	3
700,000 to 800,000	1

In the same 31 positive tests the primary peak occurred as follows

agar by the pour plate technic. The quantitative plates were incubated at 37 C., and results were read after twenty-four and forty-eight hours' incubation. For qualitative bacteriologic study, one 4 mm. loop of all macroscopically turbid specimens was streaked in duplicate directly on trypticase soy blood agar plates (5 per cent defibrinated horse blood) and eosin-methylene blue-agar (E.M.B.) plates (Levine). All clear specimens after removal of the 0.1 ml. portions for quantitative study were centrifuged at 2,500 rpm for ten minutes. The centrifugate was streaked onto the same media as above.

A Furadantin diagnostic tablet (10 mg.), a tetracycline (2.5 mcg.) and a streptomycin (2.5 mcg.) wet filter paper disk⁴ were placed on the site of initial streaking on each blood agar plate. One set of blood agar plates and one set of E.M.B. plates were incubated aerobically at 37 C. for twenty-four hours, and the other set of each media was incubated under strict anaerobic conditions.⁵

Quantitative plate counts were made and recorded on a basis of total organisms per milliliter, regardless of species. Generic and species identification was made on a basis of cultural, morphologic and biochemical studies. The media of King and his associates⁶ were used for *Pseudomonas*

aeruginosa and fluorescens differentiation. Enterococci were differentiated from hemolytic, nonhemolytic and viridans streptococci by inoculation into trypticase soy broth containing 6.5 per cent sodium chloride and by mannitol fermentation. *Proteus* was identified by the use of the urease test.⁷ Paracolon species were identified on the basis of latent (ten to thirty days) lactose fermentation. Diphtheroids were identified by cultural growth and gram stain morphologic studies.

Susceptibility Testing.—A composite broth culture for Furadantin serial tube dilution susceptibility testing was made by picking three separate colonies of each species from each blood agar plate showing growth. These cultures were also used to reevaluate the initial Furadantin disk test and to determine the susceptibility of the isolates by the wet disk technic to tetracycline, chlortetracycline, oxytetracycline, chloramphenicol, neomycin and polymyxin.

The test tube susceptibility test for Furadantin was that previously described.⁸ Serial tube dilution susceptibilities were not studied with the other antibiotics. Interpretation of the disk results was based on data previously published by one of the authors.^{4b}

Assay.—The assay of Furadantin in urine after institution of therapy was done primarily by using a bio-assay Oxford cup technic. Good correlation with this method for Furadantin in the urine specimens was obtained with the spectrophotometric method of Paul.⁹ Quantitation was not of the same order as reported by Paul,⁹ however, since the total output of urine for these patients was not determined. The presence or absence of Furadantin by bio-assay was considered significant. It is assumed that urine levels above those to be reported were present during therapy. Since the patients were not hospitalized, however, the Furadantin levels are in

TABLE 1.—Organisms and Their Susceptibility in Vitro to Furadantin in Patients with a Single Infection

Species	Total No.	Susceptible %	Resistant, %
<i>E. coli</i>	25	24 (96)	1 (4)
<i>A. aerogenes</i>	18	9 (50)	9 (50)
<i>Proteus</i> species	11	9 (81.8)	2 (18.2)
<i>Pseudomonas</i> species	4	0 (—)	4 (100)
<i>Ps. aeruginosa</i>	3	0 (—)	3 (100)
Enterococci	4	4 (100)	0 (—)
Paracolonbactrum species	1	0 (—)	1 (100)
Total	66	46 (69.7)	20 (30.3)

The results given above show the wide variations which occur in different samples of water from the same source, under conditions as nearly comparable as possible, in regard to their power of promoting growth of the same organism

IV *Experiments with other waters in relation to their power of promoting growth of bact E after autoclaving, when incubation was at 37° C*

In table XI are analysed the results obtained when autoclaved samples were inoculated with bact E and incubated at 37° C In the majority of cases the waters had been treated by slow sand filtration none was chlorinated The Bohernabreena reservoir is that from which the Dublin (Rathmines) water is obtained The Roundwood reservoir supplies the Dublin (Vartry) water

TABLE XI

	Samples	Positive	Negative
Belfast Mourne	2	2	0
Stoneyford	1	1	0
Woodburn	3	2	1
Bohernabreena reservoir	1	1	0
Cork	1	0	1
Dublin Rathmines	6	3	3
Edinburgh	1	0	1
Galway	1	1	0
Limerick	1	1	0
London Lee	1	1	0
Thames	1	1	0
Roundwood reservoir	1	1	0
Well	1	0	1
Glass distilled	6	0	6

In most of the experiments the investigations were carried only sufficiently far to determine if growth had occurred or not The lowest count regarded as positive was 1300 where the inoculum was 170 In all other cases the inoculum did not exceed 430 and the count taken as positive was more than 2000 In one case (Belfast Woodburn, flask 182), where the inoculum was 60, the peak recorded was 850,000, which was higher than was ever obtained with Vartry water under similar conditions In a few cases where the flasks were kept, very long periods of positive culture were obtained Belfast (Woodburn, flask 49) gave a positive culture on the 211th day and Belfast (Stoneyford, flask 50) on the 254th day, when the experiment was terminated by an accident These periods greatly exceed any obtained with Vartry water

The results obtained with Vartry water show the danger of generalising from a single test, and some of the waters here recorded as negative might, on further testing, have shown positive results

of allergic toxicity with Furadantin, eosinophil counts were made on a series of patients undergoing therapy.

Dosage.—The dose of Furadantin used was 100 mg. four times daily. A maximum dosage of 200 mg. four times a day was given to 2 patients over a period of ten days.

Evaluation.—Patients were considered cured when they were clinically free of symptoms and when five bacteriologic cultures, taken at weekly intervals after discontinuance of the drug, were negative.

Laboratory and Clinical Studies.—The laboratory and clinical results are reported in terms of the bacteriologic observations, as follows:

1. Patients on whom only 1 significant bacterial species was isolated at any time.

2. Patients in whom 2 significant different bacterial species were isolated, either on the first urine culture or during the course of the study.

3. Patients in whom 3 significant different bacterial species were initially isolated, or during their course of study.

4. Patients in whom 4 significant different bacterial species were initially isolated, or during their course of study.

Table 1 presents the data on 66 patients from whom a single microorganism was isolated. The species and their susceptibility to Furadantin are given in the table.

TABLE 4.—Patients Infected with Two* Different Bacterial Species

Species	No. of Cases	Urine Assay		Organisms Res.	Organisms Sus.	Patient Rx Intolerant	Bacterial Cure		Clinical Cure		Comment
		+	—				+	—	+	—	
A. aerogenes Proteus sp.	4	4	0	2	2	0	2	2	3	1	One resistant <i>Proteus</i> in 2 cases, no bacterial cure. Clinical cure in one case with resistant organism
A. aerogenes E. coli	8	6	2	4	4	1	4	4	5	3	1 patient refractory to therapy. 3 patients with resistant organism. One patient with resistant organism had bacterial and clinical cure
A. aerogenes Pseudomonas sp.	1	1	0	1	0	0	0	1	0	1	
E. coli Proteus sp.	2	1	1	0	2	0	1	1	1	1	1 patient treated one week
E. coli Enterococci	3	2	1	0	3	0	1	2	1	2	1, no assay at any time, though organism susceptible. 1, last specimen, Enterococci present, no assay obtained
A. aerogenes Enterococci	1	1	0	0	1	0	1	0	1	0	Patient intolerant to therapy
Pseudomonas sp. Enterococci	1	1	0	1**	0	0	1	0	1	0	
Pseudomonas sp. E. coli	1	1	0	1	0	1	0	1	0	1	
Total	21	17	4	9	12	2	10	11	12	9	

*More than 1 organism isolated some time during treatment, not necessarily simultaneous infection.

**Though a resistant *Pseudomonas* species was present, therapy was effective.

to determine if coliform bacilli in fresh faeces would grow in autoclaved Vartry water Various dilutions of fresh human faeces

TABLE XIII

Organism.	E	4	6	14	17	19	88	97	NC 844.
Motility	—	—	+	+	—	+	—	—	—
Sucrose	—	AG	—	AG	—	—	AG	AG	—
Dulcitol	—	—	AG	AG	—	—	AG	AG	—
Salicin	AG	AG	AG	—	—	AG	AG	AG	AG
Cellobiose	—	AG	—	—	—	—	—	—	—
Inositol	—	AG	—	—	—	—	—	—	—
Amygdalin	—	A	—	—	—	—	A	—	—
Adonitol	AG	AG	—	—	—	AG	—	—	—
Dextrin	—	AG	—	A	AG	A	—	—	A
Starch	A	AG	—	A	AG	A	A	A	A
Indole	+	—	+	+	+	+	+	+	+
Voges Proskauer	—	+	—	—	—	—	—	—	—
Methyl red	+	+	+	+	+	+	+	+	+
Koser	—	+	—	—	—	—	—	—	—
MacConkey's type	I	IV	II	III	I	I	III	III	I

were added to flasks of autoclaved tap water which were incubated at either 37° C or 22° C Only lactose-fermenting bacilli were enumerated (table XIV)

TABLE XIV

Flask no	209	208	211	210	213	212
Dilution of faeces	1 10,000		1 100,000		1 1,000,000	
Temperature	22° C	37° C	22° C	37° C	22° C	37° C
Initial number of lactose fermenters	4100	4100	410	410	41	41
Highest number of lactose fermenters recorded	2,800,000 *	1,000,000 †	320,000 ‡	890 §	140,000	No increase ¶

* This number was reached on the 3rd day Counts were not made later, so the peak may have been higher

† This number was reached on the 3rd day Counts were not made later, so the peak may have been higher

‡ This number was reached on the 5th day when the curve was still rising Counts were not made later so the peak may have been higher

§ This number was reached on the 14th day when the curve was still rising Owing to an accident the incubator temperature exceeded 50° C and the experiment terminated It is probable that the peak would have been higher

|| This number was reached on the 12th day when the curve was still rising Counts were not done later, so the peak may have been higher

¶ Negative counts were obtained from the 5th until the 14th day, when an accident to the incubator terminated the experiment

Two colonies were picked from the plate made with 1 c.c. of a 1 1000 dilution of flask 211 on the 5th day These were found to consist of Gram negative bacilli which fermented, with gas production, lactose, glucose,

same as the initial strain. This increase in drug tolerance is definitely of a low order in relation to the prolonged period of therapy.

In the other instance of clinical cure with two different bacterial species, 1 of which was resistant *in vitro* to Furadantin, the two species were an *in vitro* susceptible *E. coli* and an *in vitro* resistant *A. aerogenes*. This patient was given continued therapy for six weeks. The *E. coli* was eliminated, but the *A. aerogenes* persisted. The resistance of the species oscillated between 15 and 30 mg. per hundred milliliters. Because of the Furadantin resistance of this microorganism *in vitro*, the patient was given sulfisoxazole for four weeks. During this time the *in vitro* Furadantin-resistant *A. aerogenes* disappeared from the urine, but an *in vitro* Furadantin-susceptible *E. coli* reappeared. The patient was again given Furadantin therapy for two weeks, at the end of which time the urine was free of *E. coli*, but small numbers (less than 100 microorganisms per milliliter) of micrococci appeared in the urine. On the final bacteriologic evaluation of the urine, the *in vitro* Furadantin-susceptible *E. coli* again reappeared in the urine. At that time the patient was clinically free of symptoms. This case is included in the series because of the reappearance of organisms and the initial and ultimate effect of Furadantin, which can be assumed to be partially responsible for cure. One cannot deny the

possibility that, if sulfisoxazole alone had been used in this single case, effective therapy could have resulted.

It is interesting to note that, in this series, bacteriologic and clinical cure was effected with 1 patient from whom enterococci, susceptible *in vitro* to Furadantin, and an *in vitro* resistant *Pseudomonas* species, other than *aeruginosa*, were isolated.

Of 21 patients with infections with two different bacterial species, clinical cure was effected in 57.1 per cent of the cases and bacteriologic cure in 47.6 per cent. In 1 instance there was a clinical cure but no bacteriologic cure.

Table 5 presents the data on 8 patients. Three different bacterial species were isolated from each. Of the 8 patients, clinical and bacteriologic cure was effected in 5 (62.5 per cent). Statistically these data are possibly not too significant, because of the limited number of cases. The effectiveness of Furadantin, however, is exemplified. In this series 1 patient with *in vitro* resistant *E. coli* and *Pseudomonas* species responded favorably to therapy. Also, cure was effected in 1 patient in whom 2 of the species, an *E. coli* and a *Paracolobactrum* sp. were susceptible *in vitro*, and one, an *A. aerogenes*, was resistant *in vitro* to Furadantin.

Table 6 presents the data on 5 patients, from whom 4 different bacterial species were isolated. In 2 of the 5, clinical and bacteriologic cure was effected. In 1 in-

TABLE 7.—Summary of Data on 100 Patients Treated with Furadantin

Type of Infection	No. of Cases	Cure		Urine Assay		% Cure		Refractory to Therapy	Organisms Resistant <i>in Vitro</i> , No. of Cases
		Bacterial	Clinical	Positive	Negative	Bacterial	Clinical		
1 species	66	42	42	50	16	63.6	63.6	4	19
2 species	21	10	12	17	4	47.9	57.1	2	9
3 species	8	5	5	8	0	62.5	62.5	0	6
4 species	5	2	2	5	0	40.0	40.0	0	4
Total	100	59	61	80	20	59.0	61.0	6	38

therapy. Bacteriologic culture of all urine specimens to confirm the clinical picture in cases of infection of the urinary tract, or to follow the effectiveness of therapy, is strongly recommended.

COMMENT

Treatment with Furadantin in 100 unselected cases of uncomplicated infection of the urinary tract infection has been reported. Bacteriologic and/or clinical cure in 61 per cent of cases confirms the effectiveness, as reported by other clinicians, of this chemotherapeutic agent in treating such infections when they are associated with the microorganisms identified in this study.

Infections of the urinary tract caused by proteus species are generally considered most difficult to treat effectively. A favorable response to Furadantin, however, was effected in certain instances when there were apparent complications with other gram-negative or gram-positive bacterial species. Furadantin was effective not only in infections with a single bacterial species but in infections involving several species, as well as in patients who underwent repeated, recurrent infections caused by different bacterial species.

Side reactions consisted of nausea in 6 patients. This is not considered a serious drawback to the administration of Furadantin. Prompt withdrawal of the drug was quickly followed by disappearance of the nausea.

The generally used dose of 100 mg. of Furadantin every four hours may be continued, with tolerant patients, for an extended period without any untoward manifestations.

It is pointed out from this study that the routine disk susceptibility test should be done coincidentally with the bacteriologic studies. There is an excellent correlation between the *in vitro* susceptibility and the therapeutic results. Using the

presently available 100 mcg. Furadantin disks, a wide zone of clearing (20 mm. or more overall) indicates a highly susceptible microorganism. If the zone of clearing is between 12 and 15 mm. the organism is sensitive, and if the zone of clearing is less than 12 mm. the organism is moderately resistant. The degree of resistance as interpreted does not in itself mean any alteration from the regular 100 mg. schedule. Lack of response of an infection due to an organism susceptible *in vitro* indicates need for increase of the dose to 200 mg. every four hours for a period of ten days, if the patient is tolerant.

It has been demonstrated in this study that a concentration of active Furadantin in the urine as high as 30 mg. per hundred milliliters can be obtained. The susceptibility of most microorganisms isolated in this study was well within this range. It is considered that bacterial species refractory to concentrations above 30 mg. per hundred milliliters will not respond favorably to therapy, but, as has been shown, this does not always hold true.

The use of bacteriologic culture of all urine in the diagnosis and in the follow-up of therapy cannot be too strongly stressed. Diagnosing or evaluating infections of the urinary tract on the sole basis of the macroscopic appearance of the urine can be grossly misleading. Credence based on the report of routine urinalysis and interpretation based on the presence or absence of leukocytes per high power field can be in direct opposition to the true bacterial picture.

SUMMARY

1. Furadantin (N-(5-(nitro-2-furfuryl)-1-aminohydantoin) was effectively used in the treatment of 61 of 100 patients with uncomplicated clinical infections of the urinary tract.

Bacteriologic studies of the urine of each patient isolated one to four of the

temperature In this case the 22° C sample remained longer positive In four of the experiments growth occurred at each temperature In these the peak was always higher in the 22° sample and usually occurred later In two experiments growth with high peaks occurred at 22° but not at 37° C

The results in expt 1 were unexpected, as this was the first time a water had given growth at 22° and not at 37° Negative counts were given in flask 121 (37°) up to the 13th day On the 15th day the contents of this flask were divided into two Both fractions were inoculated with 110 bact E per c c one was kept at 37°, the other at 22° The former again gave no increase, but the latter gave a peak of 540,000 The difference at the two temperatures was therefore due to some inherent quality of the water and not to any technical error Subsequent other examples

TABLE XVII

Experi ment	Water	Flasks	Inocu lum.	37° C		22° C	
				Highest count	Day of highest count or last day positive	Highest count	Day of highest count or last day positive.
1	Stoneyford	121, 120	63	No increase	2	480,000	5
2	Woodburn	182, 181	60	850,000	3	1,100,000	3
3	Mourne	184, 183	60	380,000	3	No increase	2
4	Rathmines	195, 192	110	3,900	2	240,000	10
5	Roundwood	303, 302	220	360,000	3	670,000	3
6	Rathmines	343, 342	410	No increase	0	780,000	7
7	Rathmines	351, 350	320	190,000	3	280,000	10
8	Well	361, 360	250	No increase	1	No increase	3

of water were encountered which gave growth at 22° and not at 37°, and also those which gave growth at 37° and not at 22°

Discussion on section VI The type of growth of bact E in autoclaved water depends on the temperature of incubation At 22° C higher counts are obtained, waves of alternate increase and decrease occur less commonly and the period during which bacilli survive is greatly prolonged These results are probably to be explained by less active metabolism at the lower temperature A specimen of water may prove suitable for culture at 22° and not at 37° or vice versa Since the bacillus grows readily in ordinary media and usually in water at either temperature this phenomenon must be due to the water rather than to the bacillus

VII *Comparison of raw and autoclaved water as culture media*
 count in all experiments so far recorded, the samples of water were the 63rd before inoculation This practice was adopted to 69th a confusion due to bacteria originally present in the samples

Con el estudio bacteriológico, se aislaron de la orina de cada paciente, de una a cuatro de las siguientes bacterias: *E. coli*, *A. aerogenes*, las especies de *proteus*, especies de *enterococos* y *Pseudomonas* diferentes de *aeruginosa* (*P. aeruginosa*).

2. Se observó excelente correlación entre los resultados de los tests de susceptibilidad *in vitro* y los resultados clínicos, con la terapéutica; con pocas excepciones.

3. La confianza en la observación macroscópica rutinaria de la orina o en la incidencia de leucocitos por campo de gran aumento como índice de infección pueden desorientar grandemente.

4. No obstante que hubo 6 casos en los cuales se observó intolerancia al Furadantin, las reacciones fueron siempre ligeros disturbios gastrointestinales. La queja más común fué náusea, que desaparecía rápidamente cuando se suspendía la administración de la droga.

5. No se encontraron reacciones alérgicas al Furadantin en ningún paciente en este estudio.

RÉSUMÉ

1. La Furadantine (N-(5 (nitro-2-furfurylidene)-i-aminohydantoine) a donné des résultats efficaces dans le traitement de 61% de cas d'infections cliniques simples sur système urinaire.

Les examens bactériologiques ont été pratiqués en isolant de l'urine de chaque malade, 1 à 4 des éléments bactériens suivants: *E. coli*, *A. aerogenes*, protéobacilles, entérocoques, et pseudomonadacés autres que les *aerogenes* (*pyocyaneus*).

2. A peu d'exceptions près une excellente corrélation a été observée entre les tests *in vitro* et les résultats cliniques avec traitement.

3. De grandes erreurs peuvent être commises si l'on se fie aux examens macroscopiques habituels de l'urine ou à l'incidence

des leucocytes en tant qu'indication d'une infection.

4. Malgré 6 cas d'intolérance à la Furadantine, les réactions ont été bénignes et ont consisté en troubles gastro-intestinaux (les nausées, symptôme habituel, ont disparu dès l'interruption du traitement).

5. Aucune sensibilisation à la Furadantine n'a été constatée.

REFERENCES

1. Dodd, M. C., and Stillman, W. B.: The *In Vitro* Bacteriostatic Action of Some Simple Furan Derivatives, *J. Pharm. & Exp. Therapeut.* 82:11 1944.
2. Carroll, G., and Brennan, R. V.: Furadantin, *J. Urol.* 71:650, 1954.
3. (a) Norfleet, M. C. Jr.; Beamer, P. R., and Carpenter, H. M.: Furadantin in Infections of the Genito-Urinary Tract, *J. Urol.* 70:113, 1953. (b) Hasen, B. H., and Moore, T. D.: Nitrofurantoin: A Study *In Vitro* and *In Vivo* in One Hundred Cases of Urinary Infection, *J.A.M.A.* 155:1470, 1954. (c) Trafton, H. M.; Beutner, E. H.; Petronio, J. J.; Lind, H. E., and Correia-Branco, M.: Furadantin in Urinary Tract Infections, *New England J. Med.* 252:383, 1955. (d) Carroll, G.; Brennan, R. V., and Jacques, R.: Furadantin: Human Blood Level and Urinary Concentration, *Southern M. J.* 48:149, 1955.
4. (a) Bondi, A. Jr.; Spaulding, E. H.; Smith, D. E., and Dietz, C. C.: A Routine Method for the Rapid Determination of Susceptibility to Penicillin and *Streptococcus*, *M. Science* 213: 221, 1954. (b) Bondi, A. Jr.; Spaulding, E. H.; Smith, D. E., and Dietz, C. C.: Agents by Laboratory, *Science* 117: 6, 1951.
5. Kolmer, J. A.; Spaulding, E. H., and Robinson, H. W.: *Approved Laboratory Technic*. New York: Appleton, Century, Crofts, Inc. 1951. 5th ed. p. 415.
6. King, E. O.; Ward, M. K., and Raney, D. E.: Two Simple Media for the Demonstration of Pyocyanin and Fluorescein, *J. Lab. & Clin. Med.* 41: 301, 1954.
7. Christensen, W. B.: Urea Decomposition as a Means of Differentiating *Proteus* and *Paracolon* Cultures from Each Other and from *Salmonella* and *Shigella* Species, *J. Bact.* 52:461, 1946. Anderson, T. G.: A Modification of the Urease Test for *Proteus*, *Science* 101:470, 1945.
8. Eaton Laboratories, Inc.: *Med. Dept. Bull.* Nos. 18-53, 1953.
9. Paul, H. E.; Austin, F. L.; Paul, M. F., and Ellis, V. R.: Metabolism of the Nitrofurans I. Ultraviolet Absorption Studies of Urinary End-Products After Oral Administration, *J. Biol. Chem.* 180:345, 1949.

temperature In this case the 22° C sample remained longer positive In four of the experiments growth occurred at each temperature In these the peak was always higher in the 22° sample and usually occurred later In two experiments growth with high peaks occurred at 22° but not at 37° C

The results in expt 1 were unexpected, as this was the first time a water had given growth at 22° and not at 37° Negative counts were given in flask 121 (37°) up to the 13th day On the 15th day the contents of this flask were divided into two Both fractions were inoculated with 110 bact E per c c one was kept at 37°, the other at 22° The former again gave no increase, but the latter gave a peak of 540,000 The difference at the two temperatures was therefore due to some inherent quality of the water and not to any technical error Subsequent other examples

TABLE XVII

Experi- ment	Water	Flasks	Inocu- lum	37° C		22 C	
				Highest count	Day of highest count or last day positive	Highest count	Day of highest count or last day positive
1	Stoneyford	121, 120	63	No increase	2	480,000	5
2	Woodburn	182 181	60	850,000	3	1,100,000	3
3	Mourne	184, 183	60	360,000	3	No increase	2
4	Rathmines	195, 192	110	3,900	2	240,000	10
5	Roundwood	303, 302	220	360,000	3	670,000	3
6	Rathmines	343, 342	410	No increase	0	780,000	7
7	Rathmines	351, 350	320	190 000	3	280,000	10
8	Well	361, 360	250	No increase	1	No increase	3

of water were encountered which gave growth at 22° and not at 37°, and also those which gave growth at 37° and not at 22°

Discussion on section VI The type of growth of bact E in autoclaved water depends on the temperature of incubation At 22° C higher counts are obtained waves of alternate increase and decrease occur less commonly and the period during which bacilli survive is greatly prolonged These results are probably to be explained by less active metabolism at the lower temperature A specimen of water may prove suitable for culture at 22° and not at 37° or vice versa Since the bacillus grows readily in ordinary media and usually in water at either temperature this phenomenon must be due to the water rather than to the bacillus

VII *Comparison of raw and autoclaved water as culture media*
 count or all experiments so far recorded, the samples of water were the 63,aved before inoculation This practice was adopted to 69th a fa confusion due to bacteria originally present in the samples

physician and by myself. Testicular biopsy was not performed, on the assumption that in these previously fertile patients it would do more harm than good. This impression has been confirmed by Henri Bayle, who condemned testicular biopsy, being convinced that the slight hemorrhage contributes to subsequent fibrosis. It is the consensus that spermatogenesis is relatively unaffected by obliteration of the vas deferens. Bayle reported observing numerous mobile spermatozoa in 3 patients with congenital absence of the vas deferens, their respective ages being 41, 36 and 29 years. The successful results obtained in this series of cases are attributed to the method of splinting, careful approximation of the anastomotic site, minimal dissection and gentleness in the handling of tissues.

SUMMARY

Sterility following vasectomy was corrected successfully by anastomosis of the vas deferens in 90 per cent of the 20 cases reported in this series.

Any previous unsuccessful attempt at vasorrhaphy is not a contraindication to reoperation, as was evidenced by a successful result in 5 of 6 patients subjected to reoperation.

Testicular biopsy prior to vasorrhaphy was not performed in this series of cases.

Surgical occlusion of the vas does not appear to abolish spermatogenesis. Normal sperm were observed in 1 patient nineteen years after vasectomy.

Epididymovasorrhaphy should be attempted when anastomosis of the vas deferens is not technically feasible.

RIASSUNTO

Nel 90% dei 20 casi qui riportati la sterilità conseguente a vasectomia fu curata, con successo, anastomizzando il deferente.

Qualsiasi tentativo di vasoraffia fatto precedentemente senza un buon esito non controindica un nuovo intervento e ciò è reso evidente dagli ottimi risultati ottenuti in 5 o 6 pazienti sottoposti a reintervento.

In questa serie di casi non si fece mai la biopsia dei testicoli prima della vasoraffia.

L'occlusione chirurgica del vaso sembra che non abolisca la spermatogenesi. In un paziente si osservò, infatti, sperma normale a distanza di 19 anni dalla vasectomia.

Qualora non sia tecnicamente possibile l'anastomosi del deferente si può tentare l'epididimovasoraffia.

RESUMEN

La esterilidad consecutiva, a la sección de los conductos deferentes fué corregida con éxito por anastomosis de los conductos en 90 por ciento de los 20 casos reportados en esta serie.

Cualquier operación plástica que se haya intentado, previamente, sin éxito, no es contraindicación para reoperar, como pudo comprobarse por los resultados con éxito obtenidos, en 5 de 6 pacientes sometidos a reoperación. No se hizo biopsia testicular, previa a la anastomosis, en esta serie de casos.

La oclusión quirúrgica de los conductos no parece abolir la espermatogénesis. Se observó esperma normal en 1 paciente, diez y nueve años después de la sección de los conductos.

Plásticas con el epidídimo deben intentarse cuando la anastomosis del conducto no es posible técnicamente.

ZUSAMMENFASSUNG

Die nach Samenstrangextirpation aufgetretene Unfruchtbarkeit e 90 Prozent einer Reihe von 2

Table XVIII records the results obtained with Vartry water, used raw and after autoclaving, inoculated with bact E and incubated either at 37° or at 22° C

In all the experiments where any growth occurred, autoclaved water was superior as a culture medium to raw. In no case was growth obtained in raw water at 22° C. In eleven cases autoclaved water gave growth at 37°, in nine of these the water used raw also gave growth.

Table XIX records experiments carried out with other waters, used raw and autoclaved, inoculated with bact E and incubated at either 37° or 22° C.

TABLE XIX

Experiment	Water	Flasks	Inoculum	37° C				22° C			
				Raw		Autoclaved		Raw		Autoclaved	
				Highest count	Day of highest count or last day positive	Highest count	Day of highest count or last day positive	Highest count	Day of highest count or last day positive	Highest count	Day of highest count or last day positive
1	Stoneyford	115, 121 114, 120	61	No in crease	0	No in crease	2	No in crease	2	480,000	5
2	Mourno	188, 184 186, 183	60	"	8	300,000	3	"	0	No in crease	2
3	Rathmines	194, 195 191, 192	110	2,000	2	3,900	2	"	5	240,000	10
4	Round wood	300, 303 208, 302	220	No in crease	4	360,000	3	"	6	670,000	3
5	Rathmines	311, 313 340, 312	410	13,000	2	No in crease	0	510	2	710,000	5
6	"	348, 351 346, 350	320	2,500	2	190,000	3	600	3	280,000	10
7	Well	358, 361 356, 360	250	No in crease	1	No in crease	1	No in crease	8	No in crease	3

In all cases except one where growth occurred in autoclaved water, this was superior, as a culture medium, to raw water. In the exceptional case (no 5), growth was obtained at 37° C in raw, but not in autoclaved water. Among these experiments there are two (nos 5 and 6) in which some growth occurred in raw water at 22°, but with these, better growth occurred at 37°.

Discussion on section VII. The experiments detailed in section VII prove that in practically every case a water which, in the raw state, gives either no growth or poor growth of bact E is greatly improved as a culture medium by autoclaving. In only one experiment was a really striking multiplication of bact E in raw water observed. In this (flask 435, table XVIII) an inoculum of 360 gave a peak of 130,000. In general multiplication occurred in raw water more readily at 37° than at 22° C. This suggests that, under natural conditions, growth of coliform bacilli

some overall improvement in the total functioning of the child, apparently related to achievement of some degree of physical independence.

The most frequently encountered deformities of the lower extremities are adduction of the hip, flexion of the knee and equinus of the ankle. This has been the experience of other observers.⁴ Less commonly observed have been flexion and internal rotation contractures of the hip, genu valgum and valgus and varus deformities of the foot.

It is essential to realize, as was emphasized by Phelps,⁵ that in any case of spastic paralysis three types of muscles may be observed: (1) spastic, (2) normal, (3) flaccid and paralyzed. A careful muscle survey should be made, since the interrelation of the muscle groups will determine whether operation is indicated and, if so, the operative procedure of choice. In some instances it is necessary to examine the child on several occasions to obtain an adequate analysis of the muscular functional relation. Failure of proper evaluation of the power of the antagonist muscle groups was primarily responsible for the poor results in certain cases of our series.

It is axiomatic that operation must be preceded and followed by adequate, intelligent physiotherapy and occupational therapy.⁶ The surgeon attempts to bring the antagonist muscle groups into gross equality and, as described by Crothers,⁷ the operations are usually devised to give balance by subtraction of power.

It has been our practice to make a motion picture of each child before and after operation, since we have noted that clinical impressions are often misleading in retrospect and that muscle charts alone do not yield an accurate picture of the dynamic walking pattern. We consider the motion picture records of great value in the study and evaluation of the operative procedures



Fig. 1. Roentgenogram of 2-year-old girl with mild dysplasia of acetabulum of the left hip at this early age.



Fig. 2.—A, 2-year-old boy with severe spastic adduction contracture and complete dislocation of left hip. Discovered in routine pelvic roentgen studies of children with cerebral palsy. B, roentgenograms taken three months after operation (adductor release and section of anterior branch of obturator nerve). Wide abduction with long leg casts for six weeks, followed by abduction splint of Denis-Brown type. Note progressive reformation of acetabular roof and improved position of femoral head.

IX *The effect of filtration*

Four samples of water were filtered through filter pads in a Seitz filter. The same specimens treated by autoclaving, by heating at 60°C for one hour, or by filtering through Pasteur-Chamberland filters gave growth with high peaks, but none yielded growth after Seitz filtration. The contact of water with metal in this type of filter may have been responsible for this result, but the matter was not further investigated.

A great many experiments were carried out on the effect of filtration through Pasteur-Chamberland filters. For these, F filters were always used and filtration was performed from without inwards. The following table compares the highest points recorded for a number of waters used raw, after autoclaving and after filtration through Pasteur-Chamberland F filters. In each case the organism used was bact. E, and the water cultures were kept either at 37° or at 22° C.

TABLE XXI

Experiment	Water	Flasks	Inoculum	37 C			22 C		
				Raw	Auto-claved	Filtered	Raw	Auto-claved	Filtered
1	Vartry	257, 260, 262	150	No in crease	No in crease	1,500,000			
2	"	274, 275, 277	270	"	230,000	2,700,000			
3	"	287, 290, 292	140	"	170,000	330,000	No in crease	450,000	440,000
4	Roundwood	295, 289, 291 300, 303, 305	220	"	360,000	No in crease	"	670,000	350,000
5	Vartry	298, 302, 304 335, 336, 329	470	"	No in crease	2,600,000			
6	Rathmines	341, 343, 345 340, 342, 344	410	13,000	"	130,000	530	710,000	610,000
7	"	348, 350, 353 346, 351, 352	320	2,500	280,000	1,600,000	660	190,000	1,600,000
8	Well	358, 360, 363 356, 361, 362	250	No in crease	No in crease	1,200,000	No in crease	No in crease	1,200,000
9	Vartry	377, 376, 369	380	1,800	190,000	2,400,000			
10	"	379, 381, 382	370	2,200	380,000	800,000			
11	"	398, 397, 396	280	4,100	310,000	220,000			
12	"	406, 409, 412	250	1,500	780,000	780,000			
13	"	435, 437, 426	360	130,000	360,000	380,000			

In one case, at 37° C, the filtered water gave no growth. In every other case filtered water was superior to raw as a culture medium. In 12 tests filtered water was superior to autoclaved and in 5 inferior. In 1 there was no difference. Some of the high points, such as 2,600,000, recorded with filtered Vartry water are superior to anything ever obtained with autoclaved Vartry water.

The frequent marked superiority of filtered over autoclaved water is shown not merely in the higher counts obtained but in the

wear until he is old enough for a bone stabilization procedure. It is essential that the power of the pedal dorsiflexors be evaluated properly. If these muscles are weak, foot drop and resultant equinus will recur despite release of the calf muscles, lengthening of the achilles tendon, or nerve section. In such cases the foot should be maintained at a right angle by a dropfoot brace until a satisfactory age for surgical treatment of bone has been reached. At that time a posterior bone block operation of the Gill or Campbell type may be carried out or, in the presence of a strong calf muscle, a foot stabilization operation of the Lambrinudi type.

The age of eight or nine years is considered the minimum age for surgical stabilization of bone. Since, as we have stated, we favor early operation on the soft tissues when definitive indications are present, it is understandable that few stabilization procedures are included in our series up to the time of writing.

Tendon transplantation to help overcome varus or valgus may be partially beneficial at the earlier ages. As was noted by Green and McDermott,² however, pedal arthrodesis, with or without tendon transplantation, offers by far the best results among operations performed on the foot.

SUMMARY

Follow-up studies are presented of children with cerebral palsy who have undergone operations for deformities of the lower extremities. A total of 177 operations on 57 patients is reviewed, and specific operative procedures are discussed.

An integrated team approach to the child with cerebral palsy is stressed. Surgical intervention is never considered until diagnostic studies are complete and sufficient follow-up data available to justify an attempt to arrive at a prognosis.

Given definite clinical spastic deformities of the lower extremities, operation should be performed at an early age, when developmental progress and abnormal neuromotor patterns appear fairly well defined. Three years seems the optimal age, and in the author's opinion the development of disabling secondary contractures of joint capsules and neurovascular structures is avoided when operation is performed at that time.

Orthopedic surgical treatment is merely one facet of the comprehensive treatment of cerebral palsy in children.

ZUSAMMENFASSUNG

Es wird über Nachuntersuchungen von Kindern mit Gehirnlähmung berichtet, an denen Operationen zur Behandlung von Entstellungen der unteren Extremitäten vorgenommen worden waren. Es liegt eine Nachprüfung von 177 an 57 Kindern vorgenommenen Operationen vor. Spezifische operative Eingriffe werden erörtert.

Es wird hervorgehoben, dass die Behandlung von Kindern mit zentraler Lähmung durch eine zusammengesetzte Gruppe von Spezialisten ausgeführt werden soll. Ein chirurgischer Eingriff sollte niemals in Erwägung gezogen werden, solange nicht alle diagnostischen Untersuchungen durchgeführt sind und genügend Nachuntersuchungen stattgefunden haben, um die Möglichkeit einer prognostischen Auswertung zu gestatten.

Wenn spastische Entstellungen der unteren Extremitäten mit Sicherheit festgestellt sind, sollte die Operation im frühen Alter ausgeführt werden, wenn Fortschritte in der Entwicklung und unnormale neuromotorische Symptomenkomplexe einigermaßen klar erkannt werden können. Das beste Alter scheint das von drei Jahren zu sein, und die Verfasser glauben, dass, wenn die Operation um diese Zeit ausgeführt wird, die Entwicklung untaug-

inoculated as usual with organism E, and incubated at 37° The results are shown in table XXIII

TABLE XXIII

Flask	Filtrate	Inoculation	Highest count
308	R ₁	220	1,100,000
309	T ₁	220	No increase
310	R ₋	220	"
311	T ₋	220	"

The first filtrate gave a high count but apparently the filter very soon became exhausted

For the next experiment three filters were used (A) the same as that used in the experiment recorded in table XXIII, (B) a new filter and (C) an old filter, history unknown The three filters were boiled in sodium carbonate solution, washed thoroughly in water and autoclaved About 300 c c of Vartry water were filtered through each Equal volumes of the filtrates (240 c c) were inoculated with bact E and the flasks were kept at 37° C (table XXIV)

TABLE XXIV

Flask	Filter	Inoculum	Highest count.
318	A	310	No increase
319	B	310	"
320	C	310	1,200,000

From this result it is obvious that identical treatment does not cause different filters to yield filtrates which behave identically

A further experiment was carried out to throw light on the question of exhaustion of filters A new filter was autoclaved Through it fractions of

TABLE XXV

Filtrate	Flasks	Inoculum.	Highest counts	
			Raw	Autoclaved.
1	322, 323	370	2,000,000	2,000,000
2	324, 325	370	830,000	1,100,000
3	326 327	370	No increase	240,000

a large sample of Vartry water were filtered First approximately 800 c c were filtered (filtrate 1), part of which was used raw, part after autoclaving

in 39 per cent. Cephalic presentations occurred in 87 per cent, breech presentations in 6.8 per cent, and transverse presentations in 4.8 per cent. Twins were delivered in 1.4 per cent.

The standard treatment at Baylor Hospital for central placenta praevia or placenta praevia that covers more than a marginal portion of the os is cesarean section. The amount of cervical dilatation must be taken into consideration, and section is the treatment if the patient has an unripe cervix or cervical dilatation of less than 5 cm. Twenty-nine patients, or 20 per cent, were delivered vaginally in this series. Artificial rupture of the fetal membranes and, in a few cases, pitocin were used to induce or hasten labor in the cases of several patients delivered by the vaginal route. It is important to remember in managing placenta praevia that rupture of the fetal membranes in the face of a transverse presentation, or posterior implantation of the placenta as described by Stallworthy,⁹ can be dangerous. In the first instance additional manipulation is required, resulting in increased risk to the mother and the fetus. In the second instance, disproportion from the placenta riding over the sacral promontory occurs, displacing the presenting part anteriorly.

Cesarean section was performed in 108 cases, or 80 per cent. Fifteen were classic cesarean sections; 1 was extraperitoneal, and the remainder were of the low flap or the low cervical type. The technic of cesarean section is left to the operating surgeon, but the staff policy of the hospital is to avoid the placenta if at all possible, using a technic similar to that described by Butler¹⁰ and Neligan.¹¹ By this technic one avoids making an incision directly through the placenta and, if possible, sweeping it to one side, and rupturing the membrane at the lateral placental margin. It is important to use an adequate incision, so that this manipulation may be carried

out without too much difficulty. The amount of blood lost may be to some extent determined by the amount of time consumed from incision of the uterus to the clamping of the cord. One must remember that the fetus will lose considerably more blood if the incision is made through the placenta than if one avoids or goes around the placenta. In our series there was 1 case of recurrent placenta praevia after cesarean section. This substantiates, to some extent, Bender's premise¹² that manipulation of the lower uterine segment by conization, trachelorrhaphy and low cervical cesarean section predisposes to placenta praevia.

Delivery of the placenta, either vaginally or abdominally, is frequently accompanied by profuse and prolonged hemorrhage. The placenta is attached to the noncontractile lower uterine segment, and there is a diminution in the amount of decidua, with insufficient thromboplastin for local thrombosis. Rupture and tearing of the large dilated veins of the lower uterine segment frequently occurs. There may be some degree of placenta accreta, and forcible detachment of this leads to profuse bleeding. In some cases it is necessary to perform a rapid hysterectomy or, on occasion, to suture the bleeding vessels at the site of placental implantation prior to closing the uterus.

The management of vasa praevia or placenta praevia of a succenturiate lobe is much the same as the management of placenta praevia. In most cases, diagnosis is not made until after delivery has been accomplished by cesarean section.

Anesthesia in most cases was given by qualified physician anesthesiologists. Gas anesthesia was used in 84, or 61 per cent, of the 137 deliveries. This figure includes the 29 vaginal deliveries. In the remaining 52 cases, or 39 per cent, spinal anesthesia was employed. There has been a progressive increase over the past five years in the

prepared by autoclaving, and one (O) by roasting in a muffle furnace. The other four had been used previously, H for filtering only 650 c c of water (it was scrubbed, dried and autoclaved), A repeatedly for filtering water (it was boiled in sodium carbonate solution, washed, dried and autoclaved), K, an old filter, for several purposes including the filtration of water (it was roasted in a muffle furnace), E, also an old filter, for various purposes (it was boiled in sodium carbonate solution, washed in water, dried and autoclaved). A large sample of Vartry water was collected and each filter except P used for the filtration of 300 c c. P was first used to filter 300 c c of distilled water and then, without treatment, 300 c c of the sample. All filtrates were put in flasks (240 c c in each), inoculated with bact. E and incubated raw at 37° C. Controls consisting of unfiltered fractions of the sample were similarly tested both raw and after autoclaving (table XXVII).

TABLE XXVII

Flask no.	Filter	Inoculation.	Highest count.
366	J	380	620,000
371	N	380	330,000
372	O	380	41,000
373	P (distilled water)	380	No increase
374	P (sample)	380	150,000
367	H	380	1,300,000
368	A	380	510,000
369	K	380	2,400,000
370	E	380	3,100,000
377	Not filtered—raw	380	1,800
376	Not filtered—autoclaved	380	190,000

It will be observed that this water gave some growth when raw but was greatly improved by autoclaving. Six filtrates were superior and two inferior to the autoclaved sample. The highest counts were given by filtrates from the old filters K and E, one of which was prepared by roasting, the other by sodium carbonate solution. The new filters (J, N, O, P) gave inferior results which were dissimilar and independent of the method of their preparation. These four were all obtained from the manufacturers at the same time. From these results it appears that filters vary greatly in their effect on water filtered through them.

X. The effect of treatment of water *in vacuo*

In the experiments described in the last section, filtration was assisted by evacuation of the receiving flask by means of a Hyvac pump. As a result the water, both during and after filtration, was submitted to a negative pressure of about 20 mm. of mercury. It was therefore considered advisable to study the effect of submitting water to a similar negative pressure without filtration. In table XXVIII are given the highest counts obtained with five samples of water tested (with bact. E at 37° C.) raw, autoclaved, filtered and after treatment *in vacuo* for 2 hours.

Ophthalmologic Surgery

Enucleation with Integrated Orbital Implant

N. A. KARAKASHIAN, M.D., F.A.C.S., F.I.C.S.

PHILADELPHIA, PENNSYLVANIA

THIS report relates five years' experience in evaluating a new integrated orbital implant in 24 patients. Its development, of course, owes much to the pioneering effort of Ruedeman, Cutler, Hughes and others. This implant (Figure 1) is made up of vitallium, a casting alloy consisting of chromium, cobalt and molybdenum, that rarely causes tissue reaction and is widely used in orthopedic and dental work. Because of its relative inertness, the alloy seemed to offer promise of overcoming the problems encountered with various plastics, metals and combinations of these materials. The size of the implant is important, since implants 14 mm. or larger not only are too heavy, but offer reduced motility. This implant is 13 mm. in both height and width. Its design, evolved through trial and error, and with the assistance of Austenal Laboratories, is simple in construction. In the hollow sphere there are numerous large openings, which serve two purposes: first, they facilitate suturing the implant to the tissue; second, they permit loose orbital tissue to pass through the openings and grow into the implant in such a way as greatly to reduce the likelihood of extrusion. To promote better adhesion of tissue to metal, the surface of the implant is left unfinished.

Ordinary silk, cotton and catgut sutures

were found unsatisfactory, since they often disintegrate before the implant is firmly attached to the surrounding tissue. With the assistance of Davis & Geck's research department, nylon was found satisfactory, since nylon sutures usually remain intact for twelve to eighteen months. The technic is simple and seldom requires more than thirty minutes. After separation of the conjunctiva and tenon's capsule from the anterior eyeball, the individual rectus muscles are located, dissected and held with sutures or hemostats. After removal of the eye, gelfoam is placed and held under pressure in the cavity. Next, the implant, on which four nylon

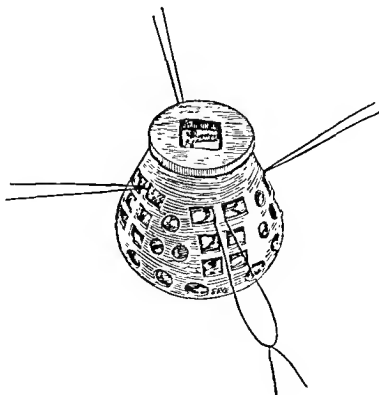


Fig. 1.—Karakashian vitallium implant.

were passed through similar filter papers. New papers were used for each fraction and, before any sample was passed through, paper and funnel were treated with 200 c c of boiling distilled water. The organism used was E, and the temperature of incubation 37° C (table XXIX)

This water, when raw, gave some growth, but any of the treatments used—autoclaving, filtering or treating with powdered filter, charcoal or kaolin—greatly increased its growth-promoting properties. The highest count was given by water treated with kaolin. The charcoal-treated water was superior to the autoclaved or filtered, but the portion treated with powdered filter was inferior to these.

The conclusions to be drawn from this experiment are that adsorbents render a water suitable for the growth of coliform bacilli and that some adsorbents are more effective than others.

Discussion on sections VIII to XI The experiments recorded in sections VIII to XI show that raw water usually fails to give any growth of coliform bacilli or at best gives only a limited amount of growth, while water which has been heated, filtered, submitted to a vacuum or treated with adsorbents usually gives good growth.

To explain these findings three hypotheses suggest themselves (1) that raw water is deficient in nutritive material and that such material is added by the treatment to which the water is submitted, (2) that raw water contains nutritive material but in unsuitable form, and that the treatment makes this material suitable for the growth of coliform bacilli, (3) that raw water contains nutritive material in suitable form and also an inhibitory agent which prevents the growth of coliform bacilli, and that this inhibitory agent is removed by the treatment to which the water is submitted.

Hypothesis (1) might deserve further consideration if the only successful treatments were those in which the water was treated with charcoal, kaolin or powdered filter, or was filtered. Any one of these might conceivably add to the water something which it lacks, but it is difficult to think of any substance common to the three materials. The impossibility of accepting hypothesis (1) is obvious from the fact that other quite dissimilar methods of treatment, such as heating or submitting to a vacuum, also render water suitable for growth. This hypothesis, then, may be rejected without further consideration.

Hypothesis (2) is more plausible and if the only successful method of treatment was exposure to heat it would probably be accepted, but we are faced with the same difficulties as in considering hypothesis (1). It is impossible to think of any alteration in the food material present in water which can be effected by heat, filtration, treatment *in vacuo* or by adsorbents. We are therefore forced to consider, as more inherently probable, hypothesis (3).

gain entrance by penetrating the floor of the space. Proximally, the interdigital subcutaneous spaces communicate with the most superficial layer of the central plantar space I along the tunnels for the digital nerves. Distally each space communicates beneath the superficial transverse plantar ligament with the corresponding web space. A collar-stud abscess, with one abscess cavity lying within the calloused skin and the other occupying an interdigital space, is present occasionally.

Infection of one of these spaces is most common amongst coolies and others who work barefooted, especially in urban areas. Often the patient states that a sharp stone, a nail or a thorn has penetrated the sole. At other times the cause is infection via the lymphatics from an infected crack in the calloused skin overlying the space. Rao and Kini reported that in 19 of 23 cases the infecting organism was *Staphylococcus aureus*.

Diagnosis: The patient complains of increasing pain between the shafts of the two metacarpals that bound the infected space. Soon he is unable to walk, and the general reaction is moderately severe. Exquisite tenderness over the infected space proclaims the diagnosis. When the pus has decompressed itself into the dorsal subcutaneous space, localization is more difficult.

Treatment: Drainage must be placed away from the weight-bearing area of the

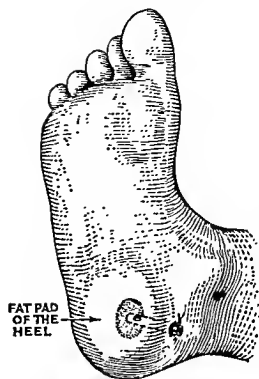


Fig. 2.—Drainage of an abscess of the heel space. The incision is placed above the calloused skin covering the heel.

sole. The best incision is that used for drainage of a web space (see Fig. 3). A hemostat is directed into the cavity filled with pus, and its jaws are opened. Tube drainage is required. In the case of a collar-stud abscess, both pockets must be drained separately through the same cutaneous incision. When pus has burrowed posteriorly through the apex of the space, an incision or a counterincision is made in the line of the digital nerve in the pliable non-weight-bearing skin of the fore part of the instep. When an extension into the dorsal subcutaneous space has occurred, a counterincision is required in the line of

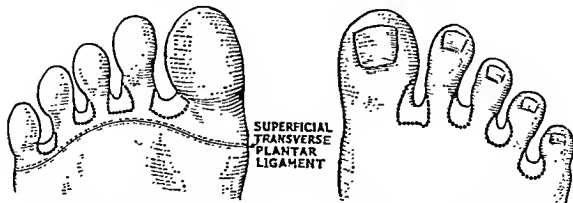


Fig. 3.—The web spaces, showing the extent on the plantar and dorsal aspects of the foot.

(flask 297) twice the amount. A volume of concentrate sufficient to give a $\times 4$ concentration of solids with a determined volume of distilled water was evaporated to dryness and heated to bright redness in a silica basin. The residue was dissolved in the appropriate volume of glass distilled water (flask 295). The three reconstituted waters were inoculated with bact E and incubated at 37°C . In each case the inoculum was 440 per c c.

Flask 296 ($\times 4$) on day 1 gave a count of 1,400,000 per c c

Flask 297 ($\times 2$) on day 2 gave a count of 570,000 per c c

Flask 295 ($\times 4$ residue after combustion) on day 2 gave a count of 3 and on day 4 and subsequent days a count of 0

Experiment 4 30,000 c c of Vartry water were evaporated to dryness. The residue was taken up with the aid of a water bath at 37°C in 250 c c of glass distilled water applied in three fractions. The fluid obtained, which was brown and turbid, was filtered through filter paper and yielded a clear sherry coloured filtrate. This was filtered through a new Pasteur Chamberland filter and made up with distilled water, passed through the filter paper and candle, to a volume of 300 c c, representing a $\times 100$ concentrate of the original water.

25 c c of the concentrate were evaporated to dryness at 37°C and the residue dissolved in 240 c c of distilled water. To this were added 10 c c of a dilution of a broth culture of bact E. The concentration of solids in this flask (no 314) was then equal to that in the original water. The initial number of bacilli was 310 per c c. The flask was kept at 37°C , and on the 2nd day, the count was 860,000 per c c.

100 c c of the concentrate were similarly evaporated to dryness at 37°C . The residue was treated with 20 c c of ether for 10 minutes and with three successive 50 c c amounts of absolute alcohol for a total time of 2 hours. It was then dissolved in glass distilled water sufficient to give a final concentration four times that of the original water (flask 317). It was inoculated with bact E (310 per c c) and incubated at 37°C . On the 2nd day the count was 1,500,000 per c c.

Experiment 5 A sample of Vartry water was concentrated in the usual way to make a $\times 50$ concentrate. This was reconstituted with glass distilled water to represent samples both richer and poorer in solids than the original. These, together with an autoclaved sample of the original water, were inoculated with bact E and incubated at 37°C . The results are summarised in table XXX.

TABLE XXX

Flask.	Water	Inoculum	Peak.	Number of peaks	Last day positive
102	Autoclaved	380	210,000	4	43
103	Reconstituted = $\times 5$	380	2,200,000	10	131
104	Reconstituted = $\times 2\frac{1}{2}$	380	1,600,000	5	51
105	Reconstituted = $\times 1\frac{1}{2}$	380	820,000	3	24
106	Reconstituted = $\times \frac{1}{2}$	380	370,000	1	17
107	Reconstituted = $\times \frac{1}{4}$	380	No increase		14

The experiments here recorded show that the growth of coliform bacilli in water is due to the presence therein of food material. This material is insoluble in ether and alcohol and is destroyed by heating to a red heat. There is little doubt that it is organic in

After-Treatment: Rest on a back splint, with the leg raised on pillows or, preferably, swung in a Bloxham's cradle, is maintained for two or three days, or until the pulse and temperature are normal. The patient should then be taken to the operating theatre and the wound or wounds packed lightly with petroleum gauze. A plaster cast is then applied. After the patient has been returned to bed, the limb is again elevated. Fixation in plaster is most important; otherwise contractures are liable to occur, resulting in a considerable deformity of the foot that is most difficult, or even impossible, to correct. After ten days or a fortnight, unless there is some indication for doing so before, the plaster cast is removed and renewed. The patient can be ambulatory during this period, but the cast should be retained until the wound has healed. After removal of the plaster edematous swelling is prone to occur and is most disabling; for, although it is not usually associated with much pain, the increased size of the foot makes it impossible to wear an ordinary shoe. Swelling can be prevented by the application of an Unna paste bandage to the foot and leg immediately after removal of the cast. The bandage must extend from the base of the toes to the tuberosity of the tibia, and it should be kept on for six weeks or longer if the tendency to swell is persistent. When the bandage becomes dirty, it is changed. In due course an orthopedic shoe will be required in most cases.

Drainage of the Lateral Plantar Space:

To evacuate pus from the lateral space the incision shown in Fig. 7 is employed. The incision passes through the skin and subcutaneous tissue, and the space is opened widely by incising the deep fascia. Corrugated rubber drainage is provided.

Drainage of the Medial Plantar Space:

The incision is almost the same as that advised for the central plantar space (see

Fig. 5), but it should be made a little more toward the plantar aspect of the foot and over the site of maximum tenderness. To summarize, it should be the rule always to evacuate pus from the plantar aspect of the foot through an incision over either the medial or the lateral border of the foot. Such incisions not only provide adequate drainage but insure that the subsequent scar is well away from the weight-bearing area.

Infections of the Dorsum of the Foot.—

The dorsal subcutaneous space is usually infected by an extension of infection from a subcutaneous interdigital space or a web space. Occasionally localization of infection occurs in the space, when infection spreads from the sole to the dorsum by way of the lymphatics; such localization is always distal to the dorsal venous arch. The incision should be placed in the line of the vessels or nerves, in order to avoid them.

The dorsal subaponeurotic space can be infected from direct puncture; it can also be involved from an extension of infection from plantar space IV. When infection of this space is suspected, aspiration should be attempted and the diagnosis confirmed before the incision is made. A longitudinal incision is then made alongside the needle. The cavity is drained with corrugate rubber for twenty-four hours.

SUMMARY

The author lists as infections of the foot the following conditions: infected blister; paronychia; infected adventitious bursa associated with a corn; infected bursa over a hallus valgus; terminal pulp space infection; suppurative tenosynovitis; infection of the interdigital subcutaneous spaces, the heel space, the web spaces, the deep fascial spaces of the sole, the central, medial and lateral plantar spaces, the dorsal subcutaneous space and the

certainly the simple nitrogenous compounds present in water. This organism, together with a completely typical *Bact coli*, was tested in Koser's medium prepared according to the usual formula, using glass-distilled water. The results are shown in table XXXII.

TABLE XXXII

Day	Flask 422	Flask 423
	Bact E	<i>Bact coli</i>
0	310	310
2	1,500,000	85,000
3	2,000,000	550,000
5	1,500,000	290,000

This experiment shows that *bact E* is capable of utilising an ammonium salt as sole source of nitrogen, as it probably does when it grows in water. It also suggests that Koser's medium as ordinarily employed does not, as is usually believed, differentiate coliform bacilli which grow in the medium from those which do not, but rather distinguishes those which grow profusely from those which either grow sparingly or not at all.

Discussion on section XII. The work recorded in section XII shows that many natural waters contain in solution substances which act as nutrient material for coliform bacilli, and suggests that this material is probably a comparatively simple nitrogenous compound. The food material can be obtained in dried form by evaporation of the water. It is insoluble in alcohol and ether. It appears to be more readily utilised by coliform bacilli than peptone.

XIII *The inhibitory factor in raw water*

The following experiments support the belief that raw water contains an inhibitory substance.

Experiment 1. A sample of Vartry water was tested both raw and autoclaved in the usual way with *bact E* at 37° C. A concentrate ($\times 20$)

TABLE XXXIII

L T bacilli This m heating	Flask.	Water	Inoculum	Peak
	141	Raw	45	180
	139	Autoclaved	45	250,000
	144	Distilled + concentrate	45	320,000
	142	Raw + concentrate	45	280

An Orthopedist Looks at Collagenous Tissue Diseases

HARVEY E. BILLIG JR., M.D., F.I.C.S.

LOS ANGELES, CALIFORNIA

PHYSICAL reactions in the morning are highly relevant to fibrous tissue, for at that time one tends to be a little "stiffer" than on the night before. Over night there is a tendency to "tighten up" with the relative inactivity of the body. The morning impulse to "loosen" results in a stretch, a yawn and, in the more ambitious, setting-up exercises. The limber cat finds itself arising and stretching periodically, even though it may then resume its nap.

Early in the study of anatomy and histology one is struck by the remarkable prevalence of collagenous tissue in the body, together with its extensive fibrous tissue sheathings surrounding the cells, groups of cells, tendons and organs, and ramifying as fascial planes and ligaments. The intricate relation of nerves, blood vessels and lymphatics wending their way through and by these fascial planes is a wonder to behold.

Time was when these collagenous tissue structures, together with bone, cartilage and teeth, were regarded as inert substance laid down within the body and not subject to the laws of living biologic substances. It is now known that these are truly living structures, constantly functioning in accordance with biochemical and physiologic principles; therefore, a better understanding of their function is possible. The knowledge that there is a constant

living physiologic chemical exchange and replacement of the elements that make up these tissues enables one to apply genetic principles, laws of mechanical force, the effects of metabolic endocrine modulation, nutritional factors (vitamins, amino acids, minerals, etc.)¹ and Bernard's pharmacological together with Langley's autonomic balancing² to these, as well as the other tissues of the body.

In the presence of certain androgenic endocrine deficiencies the vertebrae demineralize as senile osteoporosis³ with an increasing dorsal round back and pathologic compression fractures due to the weakened bony structure of the bodies. In the presence of hyperparathyroidism the generalized demineralization, with scattered localized fibrocystic areas, demonstrates a profound physiologic change of the bone physiology under an altered metabolic influence. In the same way, the collagenous fibrous tissues that make up tendons, ligaments, fascia and other connective tissues are to be regarded as living dynamic tissues.

Hisaw⁴ in 1926 published an article concerning the relaxation of the pubic ligaments of the guinea pig, showing the effect of endocrine balance on fibrous tissue and pointing the way toward understanding of the cyclic nature of shortening and lengthening of fibrous tissue with the estrus cycle and the loosening of joints at parturition to allow the pelvis to spread, thus increasing the size of the birth canal. The theoretical substance "relaxin," elaborated as a result of metabolic balance,

From the Billig Clinic, Los Angeles.
Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.
Submitted for publication Sept. 16, 1956.

Experiment 5 The conditions here were the same as in the last experiment except that a different sample of Vartry water was used and the proportions in the mixtures were different. The organism used was bact E and the temperature of incubation 37° C (table XXXVII)

TABLE XXXVII

Flask	Water	Inoculum	Peak
379	Raw	370	2,200
381	Autoclaved	370	380,000
382	Filtered	370	800,000
388	Distilled + filtered (proportion = 2 1)	370	290,000
390	Autoclaved + filtered (proportion = 2 1)	370	650,000
384	Raw + filtered (proportion = 2 1)	370	45,000

Discussion on section XIII The experiments recorded in section XIII show that raw water is not unsuitable for culture merely owing to the absence of some essential food material and that, when added to water preparations which are capable of supporting growth, it does not behave neutrally, as does distilled water, but is actively inhibitory. In most cases the inhibitory effect can be overcome, to a greater or less extent, by an increased concentration of food substance. It would appear that, in natural waters in the raw state, there is usually a slight excess of inhibitory substance, so that such waters do not support growth. In some, however, the food substance is present in excess and overcomes the effect of the inhibitory substance. Failure of a raw water to support the growth of coliform bacilli may be due to a deficiency of food material, in which case none of the treatments described renders it suitable for growth. More commonly failure is due to an excess of inhibitory over food substances and then treatment by heating or filtering, submission to a vacuum or treatment with adsorbents, renders the water suitable.

In the discussion on sections VIII to XI the conclusion was reached that inhibition was due to the presence of a chemical substance. The evidence already presented favours the idea that this substance is either a gas or is volatile, as although heat might act on a non-volatile substance in solution and destroy its inhibitory power, neither adsorbents nor submission to a vacuum could be expected to have such an effect. While some of the methods of treatment might alter a substance present in solution, the only effect common to all of them would be to eliminate from the water the inhibitory substance.

XIV *The effect of storage*

Experiment 1 A sample of raw Vartry water was tested with bact E at 37° C. Some of the same sample, stored raw for 30 days at 22° C in a

the sensory (external and internal) system feeds into the brain the stimuli, which are then transmitted to the hypothalamus; this, in turn, exercises a control over the pituitary, which, in its own turn, elaborates the specific glandular trophins (thyrotrophin, adrenal cortical trophic, gonadotrophin, etc.), which circulate via the blood stream to the particular glands and stimulate their endocrine production. These endocrines then circulate to all the tissues of the body, exercising their particular share of control of the enzymatic chemical reactions of metabolism.

Colchicine,¹⁴ for many years a standard remedy for gouty arthritis and often taken as wine of colchicum, has recently taken on an extensive and exciting new significance. Enzymatic chemical research on fibrous tissue has made wide use not only of fibroblast cultures but of the spindle fibers formed in the metaphase of mitotic cell division. The effect of colchicine¹⁴ in inhibiting the fibrous contractile mechanism of the spindle is startling. When this effect is present, the synergistic effect of the steroid hormones is pronounced, although they themselves do not have this power. Other substances that produce this colchicine-like effect are now known, although they are not nearly so effective, and it is postulated that the body normally elaborates, or at least utilizes, substances to provide this colchicinoid mediative effect. It has been shown that adenosine-triphosphoric acid (ATP¹⁴) is probably indispensable to fibrous contraction of the spindle fiber, and that the colchicine acts on the cell by modifying this mechanism.¹⁵ The role of steroid activity in this direction has been extensively studied by Katzberg of the University of Oklahoma Medical School.

The use of colchicine to enhance the mediative effect in steroid therapy for the correction of fibrous contractures in cases of collagenous tissue disease has wide ap-

plication, and, in many instances, the patient can be "trailed off" steroid therapy to the maintenance dose of colchicine (daily divided doses in amounts just short of producing gastrointestinal symptoms) without fear of recurrence of contracture, so long as this maintenance dose is continued. Return of aching in joints and "stiffness" observed within a couple of months after the maintenance dose is interrupted are frequent. At the Billig Clinic there are constantly returning patients, not seen for several years, who had decided, against advice, that they were "well" and the maintenance dose of colchicine was no longer necessary and then had noticed, within two months after discontinuing it, a recurrence of symptoms. Such patients rarely need a second "lesion." Certain of the synthetic steroids seem to cause pronounced further depression of the patient's own production of adrenal cortical steroids so that, upon discontinuance of the synthetic steroids (because of other side effects; Cushing's, etc.), there are recurrent symptoms more severe than the original ones. The administration of ACTH and testosterone to these patients, as a means of stimulating recovery of the adrenal cortex, is indicated but is not always especially successful. These patients tend to present a fixed aggravation-intolerance psychic attitude that does not clear up.

As has been pointed out, the fundamental tendency of fibrous tissue is to contract, shorten and form contractures reducing the range of motion unless this tendency is opposed. The cat remains agile from frequent stretching. Volkman's ischemic contracture, contraction of the gastrocnemius and soleus muscles, "shortening" of the achilles tendon and the scalenus anticus syndrome are examples of pronounced shortening of muscles due to fibrocytic contracture of the fibrous elements of the muscle to include muscle

XV The effect of aeration and carbonation

Experiment 1 A sample of Vartry water was tested with bact E at 37° C, raw and after one or more of the following treatments—submission to a vacuum, autoclaving, filtration, aeration and carbonation. Where vacuum treatment was used, the sample was kept for 24 hours in a flask the pressure in which was equivalent to 20 mm of mercury. For filtration a Pasteur Chamberland filter was used. To aerate a sample, 300 c.c. of water were placed in a 1 litre bottle with a glass stopper, the bottle was shaken frequently during two hours and was left over night. For carbonation, 300 c.c. of the sample were placed in a sparklet siphon of 1300 c.c. capacity and carbon dioxide gas admitted, with frequent shaking, from a sparklet bulb the sample was kept in the siphon for twenty minutes and then in a flask plugged with cotton wool until the following day (table XLI).

TABLE XLI

Flask	Treatment	Inoculum	Peak.
406	Raw	250	1,500
408	Vacuum	250	490,000
409	Autoclaved	250	780,000
412	Filtered	250	780,000
410	Autoclaved— aerated	250	680,000
413	Filtered— aerated	250	680,000
411	Autoclaved—carbonated	250	No increase
414	Filtered—carbonated	250	"

This water had some growth-promoting power when raw, which was greatly improved by treatment *in vacuo*, by autoclaving and by infiltration. Aeration subsequent to either autoclaving or filtration reduced its growth-promoting property only very slightly, but carbonation destroyed it completely.

Experiment 2 A sample of Vartry water was submitted to one or more of the treatments described in expt 1. In this case the vacuum treatment was for 10 minutes. After filtration and carbonation (10 minutes in the siphon), two parts were kept in plugged flasks, one at air temperature

TABLE XLII

Flask	Treatment	Inoculum	Peak
435	Raw	360	130,000
436	Vacuum	360	190,000
437	Autoclaved	360	360,000
426	Filtered	360	380,000
431	Carbonated—air temperature	360	No increase
433	Carbonated—vacuum	360	"
434	Carbonated—autoclaved	360	190,000
432	Carbonated—filtered	360	No increase
427	Filtered—carbonated—air temperature	360	"
429	Filtered—carbonated—37° C	360	"
428	Filtered—carbonated—vacuum	360	"
430	Filtered—carbonated—autoclaved	360	15,000

Fracture-Dislocation of the Talus with Posterior Displacement of the Body and Avascular Necrosis

I. W. DAVIDSON, B.A., M.D., F.R.C.S. (Can., Edin.), F.I.C.S.

AND

W. J. McCracken, M.D., F.R.C.S. (Can.)

SUDBURY, ONTARIO, CANADA

SOME 17 cases of fracture-dislocation of the talus, a rather infrequent injury, have been reviewed in the hope that some new light might be shed on the management of this most serious type of injury and complication. It must be emphasized that this article is a preliminary report, presenting the authors' ideas concerning treatment in an attempt to improve the results. Several cases will be presented in which these ideas have been carried out to justify their presentation at this time.

Anatomic Background: Ankle Mortise.

—The talus is intra-articular. Three-fifths of the surface is covered with articular cartilage, and the structure takes part in the formation of three joints: the ankle, the subtaloid joint and the mid-tarsal joints (talonavicular). The talus is a hinge joint, and only in extreme of dorsiflexion does it fully occupy the ankle mortise.

In normal weight bearing relatively no force is transmitted from the heel or fore-foot through the center of the talus to the center of the ankle joint. Practically all of the force is taken up by the gripping action of the external fibular and medial tibial malleoli through the sides of the talar body by means of complex ligaments of the ankle joint.

Mode of Production of Injury (Anderson).

son). — The accompanying illustration shows the third degree of a dorsiflexion injury which begins as follows:

1. The neck of the talus is impacted against the anterior edge of the lower end of the tibia, producing a vertical fracture of the neck of the talus.

2. Force is further transmitted from the neck of the talus to ligaments of the posterior part of the subtaloid joint, causing subluxation of the foot forward on the body of the talus and a posterior subtaloid dislocation.

3. The foot continues in dorsiflexion and supination. The displacement continues, and the medial surface of the tuberosity of the calcaneus comes to lie under the body of the talus. While in this position the sustentaculum tali of the calcaneus locks in front of the medial tubercle of the body of the talus. Rarely, pronation causes lateral and posterior displacement of the body.

When violence ceases and the foot is in plantar flexion, the locked body of the talus is displaced backward out of the tibiofibular mortise. It lies on the medial surface of the tubercalcanei, with the fractured surface directed laterally, the trigonal tubercle medially and the medial tubercle hooked behind the sustentaculum tali.

Avascular Necrosis.—It is interesting to note that, in this series, avascular necrosis was absent in all cases of fracture he

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.
Submitted for publication Sept. 21, 1956.

substance present in raw water and in heated or filtered water which had been kept exposed to air is carbon dioxide. Complete proof is not claimed but the experimental work supports the theory and, among the gases which are present in air, no alternative has received experimental support. Further support is afforded by pH determinations carried out by Dr James Bell. The difficulty of determining the pH of such a badly buffered fluid as water is increased by the necessity of taking samples with pipettes sterilised by heat, which affords opportunity of altering the pH by the addition of products of combustion from cotton wool and other organic material.

The pH of a sample of water before and after autoclaving was determined. The treatment caused an increase from 6.54 to 6.71. Filtration in another sample increased the pH from 6.43 to 6.56. The fact that these two methods of treatment, each of which increases the growth-promoting property of water, also increase the pH supports the theory that their main function in this connection is the removal from raw water of dissolved carbon dioxide.

XVI *Causes of extinction of bacilli in water cultures*

A number of experiments were performed to determine if, when the bacteria which had grown in water had become extinct, re-inoculation of the same water, with and without treatment, was followed by a new wave of growth.

Experiment 1 A sample of Vartry water was autoclaved, inoculated with bact. E, and kept at 37° C (flask 47). The number inoculated was 300 per c.c. and the peak 19,000. A count of 0 was reached on the 27th day and was obtained repeatedly up to the 48th day. On the 50th day the flask was re-inoculated with bact. E (240 per c.c.). The count fell to 0 on the 9th day and remained at 0 until the 59th day.

At this point the water was divided into two parts, one of which was untreated and the other autoclaved. Both were inoculated with bact. E (80 per c.c.) and in each case the count fell to 0, where it remained.

Experiment 2 A sample of Mourne (Belfast) water was autoclaved, inoculated with bact. E, and kept at 37° C (flask 48). The inoculum was 230 per c.c. and the peak 300,000. On the 42nd and 46th days a count of 0 was recorded. On the 48th day it was re-inoculated (160 per c.c.) and gave a peak of 54,000. Subcultures were still positive on the 149th day after re-inoculation but were negative on the 155th and 164th days. On the 166th day it was again inoculated (120 per c.c.). The count fell to 0 on the 7th day and thereafter no positive culture was obtained.

Experiment 3 A sample of Vartry water was autoclaved, inoculated with bact. E (180 per c.c.) and kept at 37° (flask 86). A peak of 560,000 was recorded on the 3rd day. Positive subcultures were obtained up to the 85th day, but subcultures were negative from the 95th till the 131st day. On the 132nd day the water was re-inoculated (100 per c.c.) and gave a peak of 1,400,000.

Experiment 4 A sample of Vartry water was autoclaved, inoculated with bact. E (380 per c.c.) and kept at 37° C (flask 102). A peak of 210,000

gether with early ambulation, the fracture will unite solidly, the process of revascularization will not be harassed, good functioning ankle joints will be obtained (certainly in many cases). Subtaloid fusion, therefore, can be reserved for subsequent painful arthritic changes in the joint, replacing the common combined or triple fusions performed in past years unless other factors, e.g., fracture of the lower end of the tibia with ensuing arthritis, necessitate ankle fusion. If excision of the talus should be necessary, it would seem obvious that it should be combined with tibial calcaneal fusion early.

We hope that these observations will be accepted as a preliminary, provocative report. Too few cases have been followed under this regimen to be conclusive, but up to the time of writing they encourage us to continue with the principles of treatment as enumerated, possibly returning with a more comprehensive report in another five to ten years.

SUMMARY

Eighteen cases of fracture-dislocation of the talus, a rather infrequent injury, are being reviewed in the hope that some new light may be shed on the management of this serious injury and complication.

Early open operation and early ambulation (as soon as there is evidence of consolidation of the fracture site with an early zone of revascularization beyond the fracture line) are two of the important points in the management of this condition, since they reduce the period of disability. Anatomic studies of the blood supply of the talus are included, and evidence that early fusion of the ankle and subastragaloid joints does not accelerate the revascularization process is added. In certain cases, however, arthritis of the subastragaloid joint arthritis developed later, necessitating a subastragaloid fusion, but the ankle

joints remained mobile. If excision of the talus is necessary it should be combined with tibial calcaneal fusion.

RESUMEN

18 Casos de fractura-lujación del calcáneo, accidente poco frecuente, se revisan con la esperanza de dar alguna luz en el manejo de este serio accidente y sus complicaciones.

Una operación abierta precoz y ambulación precoz (tan pronto como haya evidencia de consolidación del punto de fractura con una temprana zona de revascularización más allá de la línea de fractura) son de los más importantes puntos en el manejo de esta condición, ya que reducen el período de incapacidad. Estudios anatómicos del suplemento sanguíneo del calcáneo están incluidos y se agrega la evidencia de que la fusión precoz de la articulación del talón y subastragalina no acelera el proceso de revascularización.

En ciertos casos sin embargo, se desarrolló una artritis de la articulación subastragalina—con fusión de dicha articulación, pero el talón permaneció móvil—Si la resección del calcáneo es necesaria, debe combinarse con fusión tibia calcánea.

ZUSAMMENFASSUNG

Es liegt eine Untersuchung von 18 Fällen von Bruch und Verrenkung des Fersenbeins vor. Der Verfasser hofft, neues Licht auf die Behandlung dieser ziemlich seltenen aber schweren Verletzung und ihrer Komplikationen werfen zu können.

Frühzeitiger chirurgischer Eingriff und frühzeitige Bewegung des Kranken (sobald sich eine Festigung der Bruchstelle und die Wiederherstellung des Blutkreislaufs in der Umgebung der Bruchlinie nachweisen lassen) sind zwei der wichtigsten Punkte in der Be-

utilising such food material as is available or of resisting the action of the substances deleterious to the original strain. What was pictured as occurring was a series of transformations of type, such as occurs in the spirochæma of relapsing fever during the course of the disease.

3 That two phenomena occur coincidentally—diminution in amount of suitable food material and accumulation of a new stock of food material. The only source of this latter which suggests itself is the nitrogen of the atmosphere.

4 That the primary growth of bacilli is due to the food material of the water. When this is exhausted the majority of the bacilli die and the count falls to a low value. After a time the bodies of the dead bacilli are autolysed and the resulting material is used as food for the next wave of bacilli.

5 That there is a sufficiency of food material at all times until ultimate sterility is attained, but that there is also an accumulation of deleterious products. As a result of this accumulation growth ceases and the bacteria gradually die. Before they become extinct the deleterious product is dissipated, and growth recommences.

The first hypothesis, that the occurrence of waves of growth depends on cyclical alterations in growth activity of the organism independent of the culture medium, would be difficult to establish. The differences in behaviour of the same organism in different cultures including the occurrence of from one to four waves are against this theory, which remains unproved and is regarded as highly improbable.

The second hypothesis, that alternative strains are produced, each capable of growth under the existing conditions, was tested in the following experiment.

Experiment 1 A sample of autoclaved Vartry water was inoculated with bact. E and incubated at 37° C. The inoculum amounted to 2100 per c.c., from which the count rose to 500,000 on the 3rd day and fell to 230 on the 13th. A second peak of 100,000 occurred on the 21st day. Negative cultures were obtained from the 31st to the 42nd day and a third peak of 240,000 was observed on the 57th day, after which the count fell, reaching 0 on the 71st day. A culture was made from the water in the flask on the 16th day, when the second rise was commencing, and on the 68th day, the last on which a positive culture was obtained. The organisms in these cultures were compared with one another and with those of the stock culture. In morphology, cultural characteristics and biochemical activity no difference could be observed and sera prepared by the immunisation of rabbits with the three strains of bacilli agglutinated all strains equally. Absorption of agglutinin showed their complete identity.

This experiment shows that, in the waves of growth, there is no alteration in the type of organism.

The next experiment was designed to test the third theory which postulates the utilisation of atmospheric nitrogen.

ginning at its anterior extremity. Even though the focus can be severed from the surrounding healthy structures, there will not be sufficient normal footplate left for adequate function. The third type consists of involvement of the entire footplate area. In such cases the disease has usually penetrated into the vestibule (Fig. 1C). This is not amenable to any kind of treatment; a good result is not possible.

It would appear that any reasonable method of attack upon the stapediostapedial region would yield the same result in a given case, because the break is bound to come at the point of least resistance. The fracture of the crura so frequently mentioned is simply severance of the crura from the focus involving the footplate. The basis for this is the well known law that when two structures are joined together, the substance of each by itself (the bone of the footplate and crus, and the spongi-

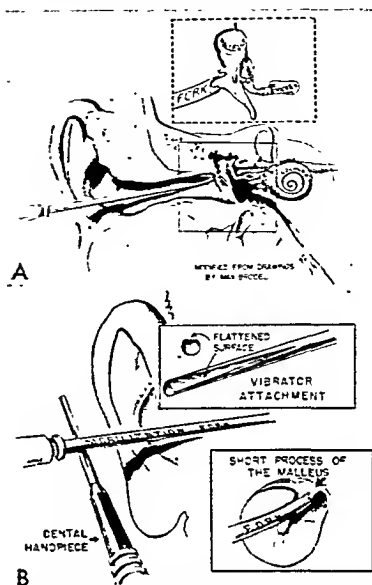


Fig. 2.—A, sketch showing relations of aural structures (frontal view) and placement of forked instrument upon short process of malleus. B, rotating flattened rod in contact with shaft of forked instrument to generate vibrations.

ose bone of the focus) is stronger than the point of contact between them.

If what has just been said is true, it follows that the simpler and less involved the procedure, the better. A procedure of this kind was described in a recent paper.²³ It consists of the placement of a forked instrument firmly over the previously exposed incudostapedial joint. A rod flattened distally 0.014 inch, revolving at 9,000 revolutions per minute, is then brought in contact with the shaft of the fork. The vibrations so generated are sufficient to mobilize the stapes in selected cases.

It was reasoned that if vibrations origi-

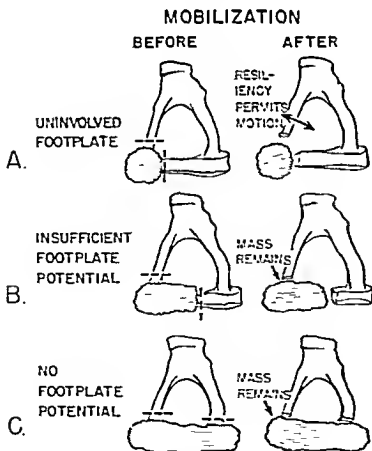


Fig. 1.—Three types of otosclerotic foci. A, ideal for employment of technic described; B, questionable to completely unsatisfactory; C, completely unsatisfactory.

The water without kaolin behaved in a normal manner, but the specimen with kaolin gave the unprecedented peak of 6,600,000 and in addition showed a relatively longer period with high counts than the majority of other waters incubated at 37° C This result suggests that the factor controlling the number of bacteria in a sample of water is the presence of an inhibitory substance which can be adsorbed by kaolin

Experiment 5 Two flasks containing the same volume of autoclaved Vartry water were inoculated with the same number of bact E and incubated at 37° C One was submitted daily, from the 4th day onwards, to a negative pressure of 20 mm of mercury From the 4th to the 14th day the treatment lasted for 5 minutes daily, on the 15th and 16th day for 30 minutes and from the 17th to the 25th day for from 1 to 2½ hours daily The counts given by the water samples in the two flasks are shown below in table XLV

TABLE XLV

Day	Flask 419 no treatment	Flask 420 vacuum treatment
0	200	200
1	110	25
2	200,000	5,700
3	510,000	500,000
4	550,000	500,000
6	610,000	470,000
8	340,000	500,000
10	290,000	440,000
12	100,000	300,000
14	3,500	310,000
16	4,700	320,000
18	100	270,000
20	40	330,000
22	12	320,000
24	2	130,000
26	1	24,000

The contrast between the two samples is striking The culture in flask 419 behaved normally, while that in flask 420 kept at a high level for a longer time than any other of the large number of water cultures tested at 37° C From the 3rd until the 10th day the counts varied from 440,000 to 500,000, that is they were practically constant From the 12th until the 22nd day there was another long period of practically constant counts (270,000 to 330,000) After this the effect of low pressure treatment broke down and there was a rapid fall

It is almost impossible to believe that the treatment which this water received and the result, which is without parallel, are a mere coincidence We are forced, therefore, to the conclusion that, by submitting a water culture to a vacuum of sufficient degree, we remove from the water something which has an inhibitory effect on the growth of bacilli in the water This "something" can

Surgical Treatment of Diseases of the Parotid Gland

ORION H. STUTEVILLE, M.D., D.D.S., F.A.C.S.

CHICAGO, ILLINOIS

THERE are three large categories of disease of the parotid gland that may require surgical intervention, namely, inflammatory diseases, tumor and trauma. For the purpose of this article, inflammatory diseases and injuries will be described briefly and the treatment of choice indicated, while the treatment of benign and malignant tumors of the parotid gland will be discussed in some detail.

Some of the inflammatory diseases of the parotid that occasionally require operation are complications of mumps, obstruction of the parotid duct by calculi, acute parotitis and secondary involvement of the gland in tuberculosis.

The most common disease of the parotid gland is mumps. Mumps in itself does not require surgical treatment, but its complications occasionally produce conditions that need surgical treatment, as the following case illustrates.

REPORT OF CASES

CASE 1.—A 10-year-old boy had mumps several weeks prior to his presentation at the clinic. He complained of swelling of the side of the face, with pain. When pressure was applied over the swelling, which was in the parotid region, thick yellowish pus could be expressed from Stensen's duct. This was treated by dilation of the ducts and application of hot wet packs at home. Culture and sensitivity tests revealed that the organism was a staphylococcus, sensitive to penicillin

and several other antibiotics. Penicillin was given, but the condition continued. After about two weeks' treatment the abscess area closed off and no longer was connected to the duct system. At this time incisional drainage was performed, and the patient made an uneventful recovery.

A second disease of the parotid gland that requires operation is obstruction of the parotid duct, or Stensen's duct, by calculi or inflammation. Obstruction of the gland's secretions may produce an inflammatory reaction and swelling. Secondary infection may result, with bacteria traveling up the duct and producing acute or chronic parotitis; also, the infection can be brought in by the blood stream.

CASE 2.—A 42-year-old man had a considerable swelling of the right side of the face, in the parotid region, of three days' duration. He was in extreme pain and was unable to eat, since any movement of the jaw increased the pain. Examination revealed a hard white mass at the orifice of Stensen's duct. The orifice was dilated and incised, and two stones, measuring 4 by 3 mm., were delivered. This was followed by copious drainage of thick yellow pus. The patient made an uneventful recovery and has had no further trouble.

CASE 3.—A 42-year-old Negro housewife was admitted to the hospital complaining of recurrent swelling in the left parotid region for the past eighteen years. During the past six months she had had constant swelling, with persistent drainage of thick yellowish material from Stensen's duct, considerable pain and a disagreeable taste in the mouth at all times. Examination revealed a pronounced swelling in the left parotid region, with drainage of thick yellowish pus from the left Stensen's duct when pressure was applied over the area. Exploration of the duct by means of a metal probe revealed it to be dilated. There were no foreign bodies or stones. Roentgen

From the Maxillofacial Departments, Northwestern University; Evanston Hospital, Evanston, Illinois; Cook County Hospital and Passavant Hospital, Chicago, Illinois.

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.

Submitted for publication Oct. 1, 1956.

dissipation proceeds, and re-inoculation may be followed by growth of the bacilli inoculated. Commonly, however, the process of dissipation proceeds more rapidly and the inhibitory substances are reduced below the critical level before extinction of the bacilli, which then recommence multiplication.

The evidence available suggests that at least one of the inhibitory substances is carbon dioxide. It is not contended, nor is it believed, that this is the only such substance produced in water cultures of coliform bacilli but, owing to the comparatively rapid dissipation of the inhibitory substance which is necessary to allow a fresh wave of growth to occur, it appears that carbon dioxide is the chief inhibitory substance produced during the early stages. Some other more stable substance may later be responsible for the final extinction of the culture.

It is reasonable to inquire why the peculiar type of growth in waves should occur in water and not in ordinary culture media. The explanation is probably that in water, which has very little buffering power and a very low concentration of protective protein substances, an amount of carbon dioxide which would be without effect in a fluid better buffered and richer in proteins is definitely prejudicial to the growth of coliform bacilli.

General discussion

The work recorded in this paper has aspects of both theoretical and practical interest. From the theoretical point of view the most important finding is that coliform bacilli of various types are capable of growing in water from various sources, utilising for their growth the small amount of nitrogenous substances, probably of simple type, which are present. Raw water has been found to be a much less satisfactory culture medium than water which has been treated by heat or filtration or with adsorbents, or which has been subjected to a negative pressure. It is believed that the experiments here recorded establish the fact that this is because raw water contains, in addition to food material, one or more inhibitory substances which are removed by these various forms of treatment. Carbon dioxide has been shown to have such an inhibitory effect, and it is suggested that it is the chief if not the only inhibitory substance present in raw water. When it is removed the bacilli can survive, utilise the food material present and multiply.

The type of growth which occurs in treated water, with alternating periods of high and low counts, has, so far as the author is aware, not been described previously in connection with water or other culture media. It is attributed to an accumulation in the medium, during the phase of active growth, of inhibitory metabolic products which have the effect of slowing and then

ameter. It was freely movable and not painful. The preoperative diagnosis was tumor in the accessory lobe of the parotid gland. An incision was made parallel to the duct and over the tumor. It was removed by excising the entire accessory lobe and dissecting it free from Stensen's duct. The pathologic diagnosis was muco-epidermoid carcinoma of the salivary gland. The wound healed well, and the patient has had no recurrences at the time of writing, five and one-half years after the operation.

CASE 10.—A 23-year-old white man was admitted to the hospital with a mass in the left parotid region, just below the lobe of the ear, in the region of an earlier surgical incision. The mass measured about 1 cm. in diameter. It was rather diffuse and was attached to the surrounding structures. A tumor had been removed from the area two years and four months earlier. The pathologic diagnosis at that time was muco-epidermoid carcinoma of the parotid gland. The entire left parotid gland was removed without injury to the seventh nerve. The mass was located in the superficial portion of the gland and appeared to be a scar formation rather than tumor tissue. A frozen section showed fibrous tissue and chronic inflammatory reaction of the parotid gland. Since there were no palpable nodes and no evidence of metastases, radical neck dissection was not performed. The wound healed well. Paresis of the lower part of the face appeared on the second postoperative day but cleared in about six weeks. The final pathologic diagnosis was chronic fibrosis of the parotid gland. No tumor has been observed on subsequent routine examinations, although the patient has been followed only for four months.

It must be remembered that there are other tumors involving the parotid gland that require surgical treatment. The other true parotid tumors are Warthin's tumor and oxyphilic adenoma. These are classified as benign tumors; nevertheless, they should be removed with a good margin of normal tissue. Tumors of any of the normal structures may also occur in the parotid region, such as hemangiomas, lymphangiomas, lipomas, fibromas, neuromas and tumors of the muscle tissue, and the diagnosis can be made only by removing

the tumor and obtaining a histologic report. Metastasized tumors from other parts of the body also occur occasionally in the parotid region.

SUMMARY

There are three classes of parotid gland disease that require surgical treatment, namely, inflammatory disease, tumor and trauma. In the individual case, treatment ranging from simple drainage to wide block dissection, including radical neck dissection, may be necessary. Four types of inflammatory complications requiring surgical treatment are described: (1) complications of mumps; (2) obstruction of the parotid duct by calculi or inflammation; (3) acute parotitis, and (4) secondary involvement of the parotid gland in tuberculosis.

The discussion of tumors of the parotid gland includes (1) mixed cell tumors, both benign and malignant; (2) muco-epidermoid tumors, and (3) other benign tumors in the region of the parotid gland. (No attempt is made to break down the classifications of the malignant tumors of the parotid gland, except to separate the muco-epidermoid from the general classification.)

Injuries to the parotid region are discussed including injuries to the gland itself and to Stensen's duct.

CONCLUSIONS

Treatment of inflammatory diseases of the parotid gland requiring surgical intervention is accomplished by drainage, relief of obstruction or, in the case of tuberculosis with secondary involvement of the parotid gland, resection of the affected parts.

A fistula resulting from lacerations to the face and penetrating to S

number of bacilli present may be more than 10,000 times the number inoculated

2 In many cases the curve of bacilli present shows an alternation of peaks and troughs. A count of 0 per c c may be followed by one of 400,000 per c c. Up to four such peaks have been observed.

3 Cultures in autoclaved water kept at 22° C show higher counts and a greatly prolonged period of positive cultures as compared with those kept at 37° C.

4 Raw water is inferior to autoclaved water as a culture medium, but in it some high counts have been observed, particularly when it is kept at 37° C.

5 Heating water for 1 hour at 60° C is almost as effective as autoclaving in making it capable of supporting the growth of coliform bacilli and filtration through a Pasteur-Chamberland F filter is usually even more effective.

6 Different filters of the same type treated in the same way yield filtrates of the same water which vary greatly in their power of supporting the growth of coliform bacilli.

7 Submission of raw water to a partial vacuum and treatment by adsorbents such as kaolin, charcoal or powdered filter render it capable of supporting the growth of coliform bacilli.

8 The nutritive material present in water can be dried and treated with ether and alcohol without destroying its power of supporting the growth of coliform bacilli. Calculated in terms of nitrogen this substance is more efficient as a nutrient than peptone.

9 The inhibitory substance present in raw water which can be removed in the various ways mentioned is probably carbon dioxide and treatment with carbon dioxide of a water which is active as a culture medium destroys its growth-supporting property.

10 The waves of growth are believed to be due to the alternate accumulation and dissipation of inhibitory substances, one of which is probably carbon dioxide.

11 Growth of coliform bacilli in water may occasionally occur under natural conditions, especially in warm countries. This would explain unexpectedly high counts in water not apparently liable to pollution.

It is a pleasure to acknowledge my indebtedness to Miss Barbara Scott who, when attempting to determine the rate of disappearance of coliform bacilli in autoclaved water, first encountered the phenomenon of growth of the bacilli. Miss Scott was unable to continue the investigation and the work recorded in this paper is entirely mine, but this does not lessen my gratitude to Miss Scott, or the credit due to her for having revealed the problem, the investigation of which has proved to be so full of interest. My grateful thanks are also accorded to my assistants, Drs L. L. Griffiths and C. H. Adderley, for much assistance in a variety of ways, and to my laboratory staff for their co-operation. I wish to acknowledge with gratitude the assistance I have received in connection with chemical and physical

Plastic and Reconstructive Surgery

Cutaneous Carcinoma of the Nose and Ear

CHARLES C. GRACE, M.D., F.A.C.S., F.I.C.S.

ST. AUGUSTINE, FLORIDA

THE intensive educational crusade against cancer, which has held sway over the past decade, has made the public ever more alert in the recognition of this dread disease. As a direct result, more early cancers of the skin are recognized than ever before. It is the purpose of this paper to direct attention to a too seldom used method of dealing with early malignant lesions of the nose and ear that will produce cosmetic results and cures gratifying to both the patient and the surgeon.

A nose or an ear may not be architecturally perfect, but it is a portion of a person's physiognomy that is constantly on exhibition. It is, therefore, understandable that a patient is justifiably unhappy when a part, or all, of either organ is disfigured or destroyed by injudicious treatment.

The atrophy of the skin and the telangiectasis produced by roentgen rays and radium are not only deforming but in themselves dangerous. The areas subjected to this therapy can never again be exposed to the direct rays of the sun for any length of time. In addition, carcinomas of the skin may develop upon irradiated areas.¹ Martin and Stewart² and others have reported the highly malignant and invasive spindle cell epidermoid carcinoma arising from previously irradiated sites.

Role of Sunlight.—It is generally agreed that prolonged exposure to sunlight of high ultraviolet content may cause cancer of the skin. The races of mankind over hundreds of years have adjusted themselves to their zones of habitation, as may be noted in the ruddy complexion of the blond, blue-eyed Nordic, the darker skin of the Mediterranean peoples and the deeply pigmented skin of the Negro race from the equatorial regions of Africa. Ackerman and Regato¹ observed that carcinoma of the skin seems to develop after chronic exposure to solar rays much more frequently in average Scandinavians and North Germans than in persons with coarser or darker skin. It is well known, they added, that Arabs, South American Indians and Negroes are only slightly susceptible, and they ascribed the definite racial differences in susceptibility to the texture of the skin and its pigment content. Boyd³ named exposure to bright sunlight as an apparent causal factor of basal cell carcinoma of the skin. He noted that the incidence of this disease is extremely high in Australia, where as many as 50 cases a day may be encountered in the outpatient department of a Sydney hospital. The conditions there are peculiar, for in that country with a tropical sun, especially strong light and low humidity, there is white labor only. In other tropical countries pigment-protected skins shield those continually exposed to the brilliant glare. The relative immunity of the large Italian element in Australia's labor population is

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.
Submitted for publication Sept. 23, 1956.

number of bacilli present may be more than 10,000 times the number inoculated

2 In many cases the curve of bacilli present shows an alternation of peaks and troughs. A count of 0 per c c may be followed by one of 400,000 per c c. Up to four such peaks have been observed.

3 Cultures in autoclaved water kept at 22° C show higher counts and a greatly prolonged period of positive cultures as compared with those kept at 37° C.

4 Raw water is inferior to autoclaved water as a culture medium, but in it some high counts have been observed, particularly when it is kept at 37° C.

5 Heating water for 1 hour at 60° C is almost as effective as autoclaving in making it capable of supporting the growth of coliform bacilli and filtration through a Pasteur-Chamberland F filter is usually even more effective.

6 Different filters of the same type treated in the same way yield filtrates of the same water which vary greatly in their power of supporting the growth of coliform bacilli.

7 Submission of raw water to a partial vacuum and treatment by adsorbents such as kaolin, charcoal or powdered filter render it capable of supporting the growth of coliform bacilli.

8 The nutritive material present in water can be dried and treated with ether and alcohol without destroying its power of supporting the growth of coliform bacilli. Calculated in terms of nitrogen this substance is more efficient as a nutrient than peptone.

9 The inhibitory substance present in raw water which can be removed in the various ways mentioned is probably carbon dioxide and treatment with carbon dioxide of a water which is active as a culture medium destroys its growth-supporting property.

10 The waves of growth are believed to be due to the alternate accumulation and dissipation of inhibitory substances, one of which is probably carbon dioxide.

11 Growth of coliform bacilli in water may occasionally occur under natural conditions, especially in warm countries. This would explain unexpectedly high counts in water not apparently liable to pollution.

It is a pleasure to acknowledge my indebtedness to Miss Barbara Scott who, when attempting to determine the rate of disappearance of coliform bacilli in autoclaved water, first encountered the phenomenon of growth of the bacilli. Miss Scott was unable to continue the investigation and the work recorded in this paper is entirely mine, but this does not lessen my gratitude to Miss Scott, or the credit due to her for having revealed the problem, the investigation of which has proved to be so full of interest. My grateful thanks are also accorded to my assistants, Drs L. L. Griffiths and C. H. Adderley, for much assistance in a variety of ways, and to my laboratory staff for their co-operation. I wish to acknowledge with gratitude the assistance I have received in connection with chemical and physical

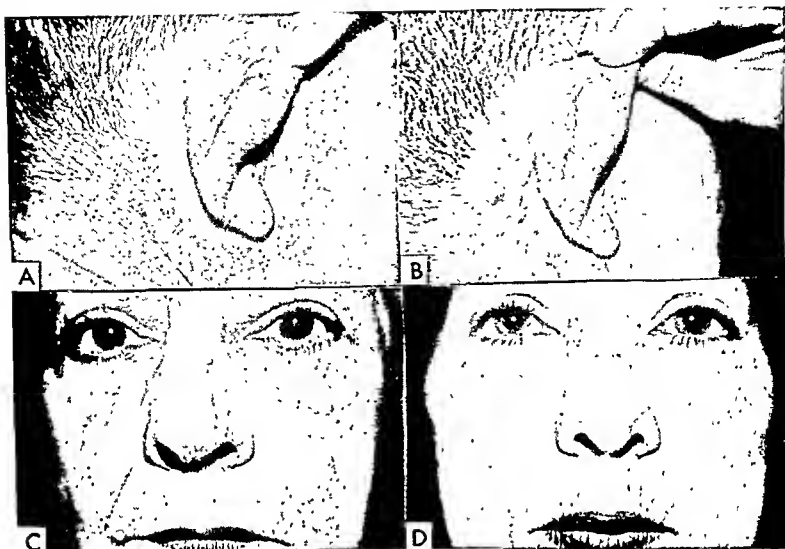


Fig. 3.—A, squamous cell carcinoma. B, results two years later. C, basal cell carcinoma of dorsum of nose. D, nose after two years.

vated rolled edge. The center is frequently crusted, and removal of the crust may reveal a raw, bleeding area or a glistening whitish surface. This tumor is especially inclined to be deeply invasive when over cartilage or bone. The rodent ulcer is a burrowing, mutilating ulcerative process that may continue until it destroys the entire ear or nose.

The squamous cell carcinoma usually arises from an existing precancerous lesion, such as a wart, keratosis, an ulcer, a pimple or a scab. Removal of the keratotic projection discloses a slightly bleeding base, with eventual ulceration. The borders are indurated; the lesion may be superficial, or there may be deep projection and invasion, and also fixation to deeper structures.¹² Not only is this tumor ulcerative and destructive, but it readily metas-

tasizes to the regional lymph nodes. In a series of 256 cases of squamous cell epithelioma of the skin analyzed by Broders,¹⁴ the average duration of the lesions in patients with metastasis was two and sixty-seven hundredths years, in those without metastasis, five and three hundredths years, and in those in whom no regional lymph nodes or salivary glands were removed, four and seventy-eight hundredths years. Ward and Hendrick¹¹ stated that it is an established fact that the younger the patient the more rapid the growth of squamous cell lesions.

The slit lamp, with its magnification and concentration of light, is an invaluable aid in the study and diagnosis of cancer of the skin. Small areas of infiltration may be seen which otherwise would escape attention. Adequate biopsy should always

ders Company, 1955, 7th ed., p. 625.

4. Hall, A. F.: Relationships of Sunlight, Complexion and Heredity to Skin Carcinogenesis, *Arch. Dermat. & Syph.* 61:589-610 (April) 1950.

5. Molesworth, E. H.: Rodent Ulcer, M. J. Australia 1:878-899 (June 18) 1927; *Urol. & Cutan. Rev.* 31:643-564 (Sept.) 1927. Cited by Hall.⁴

6. Philpott, O. S.; Woodburne, A. R., and Philpott, J. A. Jr.: Skin Cancer and Sunlight, *Rocky Mountain M. J.* 51:610-611 (July) 1954.

7. Phillips, C.: Observations Based Upon the Study of 1,434 Skin Cancers, *Virginia M. Monthly* 67:400-406 (July) 1940.

8. Schrek, R.: Cutaneous Carcinoma; Analysis of Twenty Cases in Negroes, *Cancer Research* 4: 119-127 (Feb.) 1944.

9. Howles, J. K.: Epithelioma of the Skin and Oral Mucous Membranes, *South. M. J.* 28:494-503 (June) 1935.

10. Findlay, G. M.: Ultra-Violet Light and Skin Cancer, *Lancet* 2:1070-1073 (Nov. 24) 1928. Cited

by Hall.⁴

11. Ward, G. E., and Hendrick, J. W.: Malignant Epithelial Tumors of the Skin of Head and Neck, *Am. J. Surg.* 79:771-786 (June) 1960.

12. Postlethwait, R. W.: Carcinoma of the Skin, *J. South Carolina M. A.* 47:69-71 (Feb.) 1951.

13. Andrews, G. A.: Early Diagnosis of Cancer of the Skin, *Arch. Dermat. & Syph.* 53:670-672 (June) 1946.

14. Broders, A. C.: Squamous-Cell Epithelioma of the Skin: A Study of 256 Cases, *Ann. Surg.* 73:141-160 (Feb.) 1921.

15. Gates, O., and Warren, S.: The Grading of Epidermoid Carcinoma, *Surg., Gynec. & Obst.* 58: 962-967 (June) 1934.

16. Miller, D.: Cancer of the External Auditory Meatus, *Laryngoscope* 65:448-461 (June) 1955.

17. Pack, G. T.: Treatment of Cutaneous Epithelioma, *Arch. Dermat. & Syph.* 53:576-685 (June) 1946.

In April 1922, six months before Halsted's death and thirty-seven years after the discovery of nerve-blocking, Halsted was tendered a public banquet by the American National Dental Association and presented with a gold medal. He was much touched by this spontaneous and generous, though belated, tribute. He wrote to a friend: "The celebration was a success. I am so thankful to have lived to take part in it. Not a wink of sleep did I get during the night of Saturday. I was too exhilarated for repose. Once before in my life I was kept awake by a great happiness; this was the night that I passed successfully the examination for Bellevue Hospital, in 1876." What an interesting, frank, almost naïve letter for a man of seventy, already a member of a great many learned societies and an acknowledged world-renowned master, who was so pleased by the tribute to a discovery he made when a young man of thirty-three!

Halsted, after making this remarkable discovery, made no attempt to capitalize on it or to "get himself before the public," as many lesser surgical lights succeed so well in doing. There were too many unsolved surgical problems he was too busy with.

—Major

For the past two or three years we have been carrying out studies in the Manchester district during a period when influenza has been relatively rare, i.e. during an inter-epidemic period. We have also obtained material collected during an extensive outbreak which occurred in Leningrad in February 1936 and which involved over 200,000 cases. Our results are therefore presented in two parts, those obtained during an inter-epidemic period, and those obtained during an epidemic. In each case attention was directed to isolation of the virus and to the demonstration of antibodies in human sera.

TECHNIQUE

1 Isolation of virus

One to two c.c. of human nasopharyngeal washings in saline broth were instilled into the nares of a ferret. In a few early experiments the washings were passed through a Berkefeld N filter but in the great majority of cases unfiltered material was used. Frequent observations of the inoculated animals and records of temperature were made. In all cases cultures of the washings were made. Some ferrets were killed on the third or fourth day and suspensions of their nasopharyngeal mucosa inoculated into a second ferret and to mice under anaesthesia, the mice were subsequently killed and examined on the fourth day after inoculation.

A number of attempts have been made to isolate the virus from man by direct inoculation of mice, but this has been abandoned as mice often developed pulmonary lesions due to the activity of various pathogenic bacteria present in the washings (Hoyle, 1935). In three cases the resulting lesions were shown to be due to a filterable virus, subsequently identified as the virus of infectious ectromelia, Laidlaw (personal communication) finding that on intraperitoneal inoculation the virus produced lesions resembling those of ectromelia, while by intradermal inoculation the authors produced skin lesions in which typical cell inclusions could be demonstrated. It is a point of some interest that the intranasal instillation of the ectromelia virus into mice can produce pneumonic changes.

2 Detection of antibodies in serum

1 *The neutralisation test* Virus suspensions (5 per cent) were prepared by grinding the lungs of infected mice with sand and saline and centrifuging free of cells and debris. The supernatant fluid and serum were then mixed in equal amounts, allowed to stand for 10 to 30 minutes and 3 or 4 mice inoculated intranasally under ether anaesthesia with 4 drops of the mixture, about 10,000 infecting doses of virus were used. In each experiment a saline control was carried out to test the activity of the virus.

ii *The complement fixation test* In this test the method recommended by Fairbrother (1933) for the Wassermann reaction was adopted. The sera were inactivated at 58° C for 20 minutes and the dilutions used were 1/2, 1/4, 1/8 and 1/16. The dose of complement was 2½ m.h.d. Antigen was prepared in the following manner. The lungs of mice which had died on the third or fourth day after inoculation with virus were desiccated *in vacuo* over calcium chloride and stored, only completely consolidated lungs were used. When the antigen was required 100 mg. of the dried lungs were ground vigorously with sand and a little saline, diluted to 20 c.c. with saline and centrifuged at 5000 r.p.m. for 30 minutes to remove the cells and debris.

of purely renal over osseous manifestations. In 1935, the number of reported cases of this type had grown to 6 (Cope); by 1936 to 18. Eventually, in 1944, Cope reported that an overwhelming majority of his 78 cases belonged to the renal type, and cases of the osseous type were thus heavily outnumbered. The recognition of diffuse hypertrophy of parathyroid tissue required a new operative method, since the object of surgical intervention was no longer to remove either a normally or an abnormally situated adenoma but to "reduce" the parathyroid tissue (Cope).

Although the opposition to Erdheim's theory, based on the fact that compensatory hypertrophy of only one of the organs is scarcely conceivable, was to a certain extent shaken by this new discovery, there can be no doubt that here too, as in the case of adenoma, the hyperplasia is primary, because "reduction of parathyroid tissue" results in recovery.

Thus far only the Boston group of investigators had reported these observations. After Keating of the Mayo Clinic had visited Boston in order to study the new methods of examination, however, he discovered 24 cases of hyperparathyroidism during a period of two and one-half years, while in the preceding fourteen years there had been no more than 14 cases in all (Alexander, Pemberton, Kepler and Broders). In the Mayo Clinic he observed a large number of patients with hyperparathyroidism among those with renal lithiasis; and the renal type, in actual fact, outnumbered the osseous type.

Here the diagnosis of hyperparathyroidism had been established on the strength of repeated biochemical examination, and it was the Sulkowitch test — that simple and inexpensive test method for hypercalcuria—that had given the first hint of a derangement in calcium metabolism.

There is still a marked difference, however, between the results obtained by the

Boston group and those obtained at the Mayo Clinic. Not one of Keating and Cook's patients, although these authors also noted a preponderance of the renal type, presented diffuse hyperplasia of the entire parathyroid tissue that had been so frequently reported by the Boston group. All of them, however, had adenomas.

The renal type of primary hyperparathyroidism is not necessarily, therefore, connected with diffuse hyperplasia of the parathyroid tissue, but its pathologic expression may also consist of isolated adenomas, as with the osseous type of primary hyperparathyroidism. This is not to exclude the fact that in the cases of diffuse enlargement of all the parathyroid glands, observed especially by the Boston investigators, a special and new entity of primary hyperthyroidism was presented. For a long time, of course, I also have examined all patients with lithiasis at my disposal. From the beginning of my studies on hyperparathyroidism I was interested in the relation between renal calculus, osseous changes and parathyroid tissue. As early as 1933 I published, in collaboration with Ubelhör, an experimental paper showing that, by injections of parathormone into guinea pigs with congestion of the urinary bladder, one may produce stones in the kidney. In nearly all experimental animals the calcification in the kidney can be produced in about four weeks.

In patients the results of my search for clear cases of renal hyperparathyroidism were poor. In only 1 case, at the place of my former work, was the condition observed at autopsy (parathyroid adenoma of the clear-cut renal type). During the past year in Vienna, at one of the most frequented urologic stations, only two clear cases of the renal type could be discovered; after removal of the parathyroid adenoma it was found that

For the past two or three years we have been carrying out studies in the Manchester district during a period when influenza has been relatively rare, i.e. during an inter-epidemic period. We have also obtained material collected during an extensive outbreak which occurred in Leningrad in February 1936 and which involved over 200,000 cases. Our results are therefore presented in two parts, those obtained during an inter-epidemic period, and those obtained during an epidemic. In each case attention was directed to isolation of the virus and to the demonstration of antibodies in human sera.

TECHNIQUE

1 *Isolation of virus*

One to two c.c. of human nasopharyngeal washings in saline broth were instilled into the nares of a ferret. In a few early experiments the washings were passed through a Berkefeld N filter but in the great majority of cases unfiltered material was used. Frequent observations of the inoculated animals and records of temperature were made. In all cases cultures of the washings were made. Some ferrets were killed on the third or fourth day and suspensions of their nasopharyngeal mucosa inoculated into a second ferret and to mice under anaesthesia, the mice were subsequently killed and examined on the fourth day after inoculation.

A number of attempts have been made to isolate the virus from man by direct inoculation of mice, but this has been abandoned as mice often developed pulmonary lesions due to the activity of various pathogenic bacteria present in the washings (Hoyle, 1935). In three cases the resulting lesions were shown to be due to a filterable virus, subsequently identified as the virus of infectious ectromelia, Laidlaw (personal communication) finding that on intraperitoneal inoculation the virus produced lesions resembling those of ectromelia, while by intradermal inoculation the authors produced skin lesions in which typical cell inclusions could be demonstrated. It is a point of some interest that the intranasal instillation of the ectromelia virus into mice can produce pneumonic changes.

2 *Detection of antibodies in serum*

1 *The neutralisation test* Virus suspensions (5 per cent) were prepared by grinding the lungs of infected mice with sand and saline and centrifuging free of cells and debris. The supernatant fluid and serum were then mixed in equal amounts, allowed to stand for 10 to 30 minutes and 3 or 4 mice inoculated intranasally under ether anaesthesia with 4 drops of the mixture, about 10,000 infecting doses of virus were used. In each experiment a saline control was carried out to test the activity of the virus.

ii *The complement fixation test* In this test the method recommended by Fairbrother (1933) for the Wassermann reaction was adopted. The sera were inactivated at 58° C for 20 minutes and the dilutions used were 1/2, 1/4, 1/8 and 1/16. The dose of complement was 2½ m.h.d. Antigen was prepared in the following manner. The lungs of mice which had died on the third or fourth day after inoculation with virus were desiccated *in vacuo* over calcium chloride and stored, only completely consolidated lungs were used. When the antigen was required 100 mg. of the dried lungs were ground vigorously with sand and a little saline, diluted to 20 c.c. with saline and centrifuged at 5000 r.p.m. for 30 minutes to remove the cells and debris.

aspectos da questão exigem e justificam novas pesquisas. Em nenhum caso de tumor paratiroides a operação que eu divulguei trouxe ainda uma solução completa no parecer dos cirurgiões de glândulas internas contra uma molestia endócrina mortal.

RESUMEN

Parece que hoy, treinta años después de que la primera paratiroidectomía fué efectuada con éxito para el tratamiento del hiperparatiroidismo primario, muchas preguntas están todavía en un estado de poca claridad ya que este campo de investigación no ha perdido aún su importancia.

Pero en todo caso, la operación para tumor paratiroides, que yo introduje, ya está dando verdaderos resultados a cimjanos endocrinológica mortal.

BIBLIOGRAPHY

- Albright, F.; Bloomberg, E.; Castleman, B., and Churchill, E. D.: Arch. Int. Med. 54:315, 1935.
 Albright, F.; Sulkowitch, H. W., and Bloomberg, E.: Am. J. Med. Sci. 193:800, 1937.
 Albright, F.; Sulkowitch, H. W., and Bloomberg, E.: Arch. Int. Med. 62:199, 1938.
 Alexander, H. B.; Pemberton, J.; Kepler, E. J., and Broders, A. C.: Am. J. Surg. 65:157, 1944.
 Andersen, D. H., and Schlesinger, E. R.: Am. J. Dis. Children 63:102, 1942.
 Barker, V. L., and Brines, O. A.: Arch. Surg. 39:205, 1939.
 Ben-Asher, S.: J. Lab. & Clin. Med. 24:709, 1939.
 Black, B. M.: Surg., Gynec. & Obst. 87:172, 1948.
 Borak, J., and Doll, B.: Wien. klin. Wchsnschr. 47:540, 1934.
 Churchill, E. D., and Cope, O.: Surg., Gynec. & Obst. 58:256, 1934.
 Cope, O.: Surgery 16:273, 1944.
 Cope, O.: Ann. Surg. 114:4, 1941.
 Cope, O., and Castleman, B.: Ann. Surg. 138:661, 1953.
 Coryn, G. I.: J. de chir. Belge 33:213, 1934.

- Dockerty, M. B.; Ghormley, R. K.; Kennedy, R. L. J., and Pugh, D. C.: Arch. Int. Med. 75:357, 1954.
 Eger, W.: Acta med. Nordmark 7:11, 1955.
 Erdheim, J.: Wien. klin. Wchsnschr. 41:1544, 1928.
 Gutman, A. B., and Barklay Parsons, W.: Ann. Int. Med. 12:1, 1938.
 Hellner, H.: Arch. klin. Chir. 198:243, 1940.
 Hellström, I.: Acta chir. Scand. 100:391, 1950.
 Himmelmann: Zentrbl. f. Chir. 43:258, 1935.
 Jaffe, H. L.: J. Mt. Sinai Hosp. 12:364, 1945.
 Karcher, H.: Arch. klin. Chir. 264:590, 1949.
 Keating, F. H., and Cook, E. N.: J.A.M.A. 129:994, 1945.
 Keynes, G.: Brit. J. Surg. 24:403, 1936.
 Leriche, R.: Soc. internat. de chir. (Paris) X Congress, 1935.
 Lichtenstein, F., and Jaffe, H. L.: Arch. Path. 33:777, 1942.
 Lieve, I. A.: L'ostéose parathyroïdienne. Paris: Masson et Cie, 1932. Mem. Soc. Med. Hôp. de Paris 7:132, 1947.
 Mandl, F.: Zentrbl. f. Chir. 53:260, 1926.
 Mandl, F.: Arch. klin. Chir. 143:1, 1926.
 Mandl, F.: Deutsche. Z. Chir. 240:362, 1933.
 Mandl, F., and Uebelhör, R.: Zentrbl. f. Chir. 60:68, 1933.
 Mandl, F.: Surgery 21:394, 1947.
 Mandl, F.: Schweiz. med. Wchsnschr. Suppl. 20, 1956.
 Mandl, F.: Wien. Ztschr. f. Int. Med. 3:101, 1948.
 McCallum, W. G., and Voegtlin, C.: J. Exper. Med. 5:118, 1909.
 McClure, R. D., and Lam, C. R.: Ann. Surg. 121:454, 1945.
 Meuser, H., and Kreitner, H.: Z. Urol. 43:1, 1950.
 Nickels, J.: Arch. klin. Chir. 205:488, 1944.
 Norris, E. H.: Surg., Gynec. & Obst. 84:1, 1947.
 Oehlecker, F.: Chirurgische Knochen- und Gelenkerkrankungen. Berlin, Göttingen, Heidelberg: J. Springer Verlag, 1933.
 Oehlecker, F.: Chirurgie 23:272, 1952.
 Paolucci, R.: J. Internat. de Chir. 9:209, 1949.
 Redwitz, F.: Zentrbl. f. Chir. 52, 1937.
 Rienhoff, W. F.: Ann. Surg. 131:917, 1950.
 Seldinger, S. I.: Acta Radiol. Stockholm 42:353, 1954.
 Snapper, I.: Medical Clinic on Bone Diseases. New York: Interscience Publishers, 1943.
 Snapper, I., and Boere, H. I.: Arch. klin. Chir. 170:371, 1931.
 Stephenson, H. U.: Arch. Surg. 60:247, 1950.
 Uehlinger, E.: Wien. klin. Wchsnschr. 61:417, 1949.
 Wanke, R.: Deutsche Zschr. f. Chir. 228:210, 1930.

from samples sent to the laboratory for Wassermann tests. The criterion for neutralisation was very strict as a large dose of an active virus was used and the index of neutralisation was the absence of lesions in any of the inoculated mice, the control mice invariably showed extensive lesions. Results obtained with the human virus are shown in table I. The figures are in general

TABLE I
Neutralisation of the human virus by human sera

Age group (years)	Number of cases examined	Neutralisation	
		Number	Per cent
0 $\frac{1}{2}$	4	3	75
$\frac{1}{2}$ 1	1	0	0
1 9	16	4	27
10 14	20	9	45
15 18	22	11	50
19	82	38	46
Total	144	65	45

agreement with those obtained by other workers. An interesting point is the relative frequency of antibodies in the sera of newly born infants, a similar observation was made by Francis and Magill (1936). This is indicative of the transplacental passage of maternal antibodies, such as occurs in measles, diphtheria, poliomyelitis, etc.

For the swine virus (table II), neutralising antibodies were found in the sera of 4 out of 6 infants under 6 months and in only

TABLE II
Neutralisation of the swine virus by human sera

Age group (years)	Number of sera examined	Neutralisation.	
		Number	Per cent.
0 $\frac{1}{2}$	6	4	67
$\frac{1}{2}$ 1	1	0	0
1 9	16	2	13
10 14	19	10	53
15 18	23	13	57
19	38	24	63
Total	103	53	51

2 out of 17 sera between the ages of 6 months and 10 years. The infrequency of antibodies in children has also been noted by other observers. The Hampstead workers did not find any antibodies

Portal hypertension may also develop suddenly, for instance, after ligation of the portal or hepatic vein. If the pressure increases slowly, only certain portal roots become obstructed and dilated. The flooding of the mucous membranes of the abdominal organs or of parts of the intestinal tract produces a large variety of syndromes, pathographically described as specific organic diseases. Their genesis, however, has never been explained. No wonder the cause of these fictitious diseases has never been disclosed.

Since portal hypertension may be intermittent, it may also disappear. Since destruction of the liver cells may be followed by regeneration, several clinical syndromes may improve.

Shell,¹⁴ in 1931, reported the close relation existing between insufficiency of the liver and the accompanying syndromes. Ten per cent of his cirrhotic patients had gastric or duodenal ulcers. According to Blond and Haler,⁴ all ulcers of the intestinal tract, including those of the esophagus and the rectum, are signs of intermittent portal hypertension. The known intermittent hemorrhages from esophageal and rectal varicosities are signs of portal back-pressure, depending on the actual degree of hepatic insufficiency. Alterations of the portal back-pressure may occur physiologically, e.g., at the height of the digestive process or during defecation in the majority of cases. The most frequent signs of portal hypertension are hemorrhoids and their complications; it must, therefore, be a matter of surprise that textbooks still maintain their cause to be unknown, most probably because it is too difficult to grasp the causation of dynamic processes on the basis of pathographic descriptions. With my interpretation in mind, I cannot admit a different causation for esophageal, gastric, duodenal and rectal ulcers. Colitis ulcerosa

is also due to portal backflow into the colon; that the clinical picture differs has to do only with the local intestinal flora.

Child, in 1954, stated as a result of his animal experiments: "When the obstruction to the portal flow lies outside the liver, numerous anastomotic channels develop in the immediate vicinity of the occluded portal or splenic veins. These partially circumvent the block, and portal blood gains access to the liver almost directly. The components of this type of collateral circulation are the deep cystic veins of the gall bladder, the epiploic veins of the gastric omentum, the hepatocolic and the hepatorenal veins and the accessory veins of Sappey." There are, in addition, a great number of portacaval shunts (cf. Blond and Haler, Fig. 4). Child also affirmed that, after ligation of the portal vein or after Eck's shunt operation, either in man or in the experimental animals, *survival is possible only if new portohepatic collaterals are formed that restore the portohepatic circulation.* This interpretation appears to prove that the portal blood contains toxic proteins—that is, the true carcinogenic substances, according to my interpretation. Anemia, leukopenia and thrombocytopenia belong to the syndrome of portal hypertension. It is known that after splenectomy the blood picture changes; therefore the spleen has been made responsible for the abnormal blood picture, though no explanation of its mechanism has been offered. Splenomegaly also belongs to the syndrome of portal hypertension. The supposed hyperfunction of the spleen is termed "hypersplenism," a term that explains neither the cause of the disorder nor the late effects of splenectomy. I have already pointed out that enlargement of the spleen is a sign of hepatic insufficiency and of portal backflow. Toxic proteins, when flooding the spleen, may also reach the hemopoietic or ans vi lat-

14. Snell, A. M.: Ann. Int. Med. 5:338, 1931.

specific for virus-infected lung. It was found, however, that no significant differences could be detected between the human and swine antigens. Over 200 sera have been tested in parallel against these two antigens, with the great majority (85 per cent) the readings were identical and in the remainder fixation occurred with both antigens but was slightly less in degree with the swine antigen, i.e. the difference was quantitative and not qualitative. A number of sera have also been tested simultaneously against 5 different strains of virus, 3 human and 2 swine, one of the latter had not been through the ferret and had only been passed twice in mice. In every instance the results were strictly comparable. A typical series of results is shown in table III.

TABLE III

Complement fixation test using different antigens and human sera

Antigen.	Serum.	Serum-dilutions			
		1 2	1 4	1 8	1 16
Normal lung	A	++++	++++	++++	++++
	B	++++	++++	++++	++++
Swine virus lung	A	++++	++++	++++	++++
	B	O	+	++	++++
Human virus lung	A	++++	++++	++++	++++
	B	O	O	+	++++

O = No hæmolysis, +, ++, +++ = intermediate degrees of hæmolysis, +++++ = complete hæmolysis (i.e. negative result)

It was evident that the human and swine viruses could not be distinguished by the complement fixation test, the minor differences observed being almost certainly attributable to a slight inferiority of the swine antigen. Two explanations are possible for this inferiority. It may be that the factor responsible for complement fixation was less evident in the swine virus than in the human, or it is possible that the swine-infected mouse lungs contained a smaller amount of virus. The latter explanation appears to be the more probable, as throughout our work the swine virus has been somewhat less virulent for mice than the human strain.

The possibility that the complement fixation test might be invalidated by the presence of a positive Wassermann reaction was examined, but it was found that syphilitic sera behaved as other sera.

The results obtained by the application of the complement fixation test to 295 human sera are shown in table IV. The percentage of sera found to contain antibodies was similar to that given by the neutralisation test, but, in spite of this general

Medical and Surgical Aspects of Chronic Ulcerative Colitis: An Appraisal

THE purpose of this editorial is not to belittle or condemn standard methods of management of colitis but rather to emphasize what has seemed important in treatment, both medical and surgical, over a considerable period of years. Emphasis is placed on the psychogenic factors, the basic treatment program and the rejuvenation of an old but bolder concept of what goes into the surgical problem, with a reduction in the number of ileostomies. If one stops to consider the overall problem, it becomes obvious that the physician in charge must be father confessor, advisor and executive if the best management is to be carried out. In the hospital I serve, this has, by principle and practice, grown to be the exact state of affairs. *Since the disease runs the entire gamut of medicine, it taxes the ingenuity of the shrewdest internist, the ever-observant psychiatrist and the most exacting surgical technician.* Whenever possible these responsibilities should be combined in one person, the attending physician.

One often hears it remarked that the abdomen is the sounding-board of the emotions, since it is so well supplied with autonomic nerve fibers, of both the sympathetic and the parasympathetic system. The lines of communication between brain centers and the viscera and the behavior patterns of the gastrointestinal tract that have been utilized in infancy are carried to the brain and lodged there in that reservoir of memory, the subconscious mind. In

spite of the fact that the relation between psyche and soma is well known, it is surprising how little attention is given to this matter in the actual management of gastrointestinal disorders. Rarely is an evaluation made of the personality or the life situation of the patient. The physician may be too busy to try to work this out with the patient. Giving him a prescription for a digestive medicant is the path of least resistance. Even though he admits that there is a large "nervous element" present, he often looks upon this feature as secondary and probably a consequence of the physical disorder. He does not consider the psychic factors in illness on the same scientific level with gastric analyses, stool cultures or roentgen studies, and *therefore he pays scant attention to them.* He accepts psychogenesis only abstractly and with vague understanding of the nature of mental mechanisms and the part they play in illness. It was only a few years ago that psychiatrists impressed the profession with the fact that they proposed to cure chronic ulcerative colitis with psychotherapy alone, without the use of drugs. It was an interesting exercise but, like all branches of medicine, was self-limited.

If all the interested departments can be brought into the picture and integrated, there is no doubt that the patient will be benefited. It takes time and persistence to question the patient along the line of his mental processes. He may be sensitive and conclude that he is regarded as a weakling who "can't take it," or perhaps that he actually is a "mental case." The physician, not wishing to arouse ill will or antagonism, follows the traditional line of phys-

From the Ferguson-Droste-Ferguson Hospital, Grand Rapids.

Read at the Mid-Atlantic Division Regional Meeting of the United States and Canadian Sections, International College of Surgeons, White Sulphur Springs, Virginia, Feb. 10-13, 1957.

ouse lung The test could not therefore be applied to the study of ferret sera when an antigen of mouse origin was used

Complement fixation appears to be a highly satisfactory test for the detection in human sera of antibodies against the influenza virus It is simpler to perform, more economical, and easier to read than the neutralisation test, and it has a further advantage in that it can be readily applied in a quantitative manner If, however, it is desired to demonstrate previous infection with one particular virus, it is necessary to carry out a series of quantitative neutralisation tests

B Results obtained in the Leningrad epidemic

We are indebted to Dr A A Smorodintseff for the opportunity of examining material collected during the severe epidemic of influenza which occurred in Leningrad in February and March 1936

Attempts to isolate the virus

The following specimens, each of which was the mixed product of a group of cases, were received preserved in 50 per cent glycerol

- (1) Seitz-filtered washings of six cases of acute influenza,
- (2) centrifuged washings from four acute cases,
- (3) sputum from eight cases of influenzal pneumonia,
- (4) centrifuged washings from four acute cases,
- (5) centrifuged washings from four acute cases,
- (6) sputum from ten cases of influenzal pneumonia,
- (7) sputum from nine cases of influenzal pneumonia

Ferrets were inoculated intranasally with these materials, both with and without ether anaesthesia, but in no case did infection result Serial passage of the ferret mucosa to a second ferret also gave negative results, as did direct inoculation of mice All the ferrets used (with the exception of those killed for serial passage) were subsequently tested for the presence of antibodies in the serum, but no such antibody was found The results were therefore completely negative A virus immunologically identical with the Hampstead virus was, however, isolated from some of these cases by workers in Russia

Serological studies

Ten samples of serum were received, 5 from convalescent cases and 5 from individuals who had escaped infection Neutralisation and complement fixation tests were carried out and antibodies were demonstrated in all the samples This result was not unexpected, as it is highly probable that the apparently normal individuals had either acquired immunity as a result of subclinical

baffling syndrome could be attributed, but most of the studies have been disappointing. All of us are aware of the accompanying mesenteric adenitis and the processes involved with perforation. Fistulas may occur, extending to the base of the mesentery, and then drain into the peritoneal cavity and cause peritonitis and all too frequently the patient's death. We are also well aware of the insidiousness and persistence of the staphylococcus and the streptococcus.

Nutritional anemia is always present. Iron deficiency is frequently present also, causing hypochromia and microcytic anemia. The deficiency may be due either to excessive loss of iron from the body, as in cases of chronic hemorrhage, or to an inadequate quantity of the element in the diet. This becomes a difficult replacement problem. I have come to look upon iron, given in almost any form, as a "filed-up tenpenny nail" that causes marked mechanical irritability and often excessive bleeding. I have had some success replacing iron with whole dark dried fruits, such as raisins, figs, dates, prunes or apricots.

Protein deficiency, though in itself a less common cause of anemia, is not infrequently a contributing factor, but replacement is fairly easy and satisfactory. Lack of vitamin C or certain factors of the B complex, such as riboflavin, nicotinic acid and folic acid, are important items. Five hundred mg. of vitamin C is given daily in most instances. Vitamin C is not stored; consequently, large doses are in order. Failure to utilize the specific antianemic factor may occur, though this appears to be rare. This type of anemia, of course, is treated as usual, and vitamin B12 seems to be definitely a necessity. The adrenal cortical steroids have been an extreme disappointment; in many instances in my own practice, they have been distinctly detrimental. Severe, hard-to-control hemor-

rhage has seemed to result from Cortisone therapy, though this is difficult to prove. ACTH in well regulated doses has been helpful, although the accompanying oversecretion of cortisone has produced some manifestations similar to those of adrenal cortical hypofunction. ACTH is much easier to use, though its influence on salt and water balance, alkalosis and neuropsychiatric reactions must be borne in mind. It is unquestionably extremely valuable in control of such remote manifestations as iritis and complications involving the skin and the joints.

The troublesome and insidious staphylococcus strains are usually sensitive to Tetracycline and Erythromycin.

One of the greatest disturbing factors in colitis in my own practice has been the use of milk in large quantities, particularly by the young. The great American habit of not weaning babies when they have acquired their teeth, has in a sense boomeranged upon us. Milk as a beverage is omitted from the hospital diet. Most of the patients we see are milk drinkers. The other animals, guided by nature's dictum, do not by any means follow man's direction. As soon as they get their teeth, the mother weans them, whereas we put our babies on cow's milk. If our human mothers had to provide the milk used by our milk drinkers, they would settle the question once for all; but that is another story and does not bear too much discussion. Suffice it to say that there are a great number of allergens present in milk that are not tolerated by the patient with colitis.

A record is maintained by the dietician indicating the type (usually high protein, acid ash), the amount and caloric value of the food intake and how it is tolerated. This becomes the patient's daily guide. His likes and dislikes are charted. Often im-

that the absence of influenza in the Manchester district during recent years might be due to the wide distribution of antibodies in the population. Further the results obtained with the Leningrad sera, though small in number, are what would be expected if virus were the cause of that epidemic, the titres were generally higher than those obtained with the Manchester sera (table V).

The relationship between the human and swine viruses is of some importance in view of Laidlaw's suggestion that the swine virus was responsible for the pandemic of 1918-19. Neutralisation tests have suggested that there is some antigenic relationship between the two viruses, but the evidence so far obtained is far from conclusive. Further indications of this were produced by Shope (1935) who found that the inoculation of human virus into mice gave a low degree of protection against the swine strain, although neutralising antibodies against the swine virus could not be demonstrated. The injection of swine virus gave a higher degree of protection and neutralising antibodies appeared. The complement fixation reaction has, however, afforded striking evidence of a similarity in antigenic structure of the two viruses, which behave in an identical manner in this reaction. It is possible of course, that the antigen reacting in the complement fixation test is not the virus itself but some product of the interaction between virus and lung tissue, but it is much more probable that the reacting antigen is derived from the virus and indicates the presence of a common factor in the two viruses. There would seem to be two distinct antigenic components in each virus, a specific factor reacting in the neutralisation tests and a common factor involved in complement fixation. A complex antigenic structure has also been demonstrated in the case of other viruses, *e.g.* the vaccinia virus (Craigie and Wishart, 1934) and the psittacosis virus (Bedson, 1936).

The nature and position of the two fractions have not yet been determined. This is a matter of some importance, as the position of the various antigens in the virus may be in some way responsible for the difference in the antibody response in the human infection as compared with that in the immunised horse. It is, however, also possible that this difference may be due, wholly or in part, to the route by which the virus enters the tissues and by variations in the reactivity of the tissues of the host. The question as to whether the presence of either complement-fixing or neutralising antibodies is an index of immunity is uncertain and outside the scope of this work. It is however generally assumed that, apart from new-born infants, the presence of specific protective antibodies against the human virus is the result of past infection with this virus.

The isolation from cases of human influenza of a virus so closely related to the virus of swine influenza as to possess a common

Le Diagnostic du Cancer D'Estomac a la Période Utile (Diagnosis of Cancer of the Stomach at the Time Most Favorable for Treatment. By René A. Gutmann. Paris: G. Doin et Cie, 1956. Pp. 257.

The author emphasizes the importance of making early diagnosis of carcinoma when it is amenable to operation. He describes three types of early carcinoma of the stomach; mucosal, submucosal, and "small cancer" (less than 1 cm. in diameter). Attention is called to the fact that the classic symptoms of gastric carcinoma may be entirely absent during the early stages, and in many such instances the patient's complaints are attributed to ulcer or dyspepsia. In some instances carcinoma develops over a long period of years. The patient's age is no great factor in its development.

The chapter on roentgenologic study (written by Mme. le Docteur Jacqueline Daoud) covers 126 pages and is illustrated by many diagrams. Diagnostic points are discussed in detail. The author states, contrary to current opinion, that roentgenographic diagnosis of early carcinoma of the stomach can be made in many instances. She describes the technic she considers essential for proper visualization. Fluoroscopic study is of no value except to verify what has already been demonstrated by properly taken roentgenograms. She describes the roentgenographic appearance of the infiltrating, ulcerative and fungating types of gastric carcinoma. There are numerous instructive sketches.

Dr. Gutmann disagrees with the opinion that gastroscopic study is important in the diagnosis of early carcinoma, but concedes that it is useful in confirming a diagnosis already established roentgenographically.

In the chapter on supplementary methods of diagnosis he mentions laparoscopic study, which, in his opinion, has little value. It does, however, confirm the presence of late carcinoma with metastatic involvement of the liver and peritoneum, at which stage the lesion is inoperable.

In summarizing the chapter on cytologic study (written by Prof. Laumonier) the author states that, while it may be an interesting method, it has little value in diagnosing early carcinoma, since it has not yet been sufficiently developed to be accurate.

There is little relation between gastritis and early carcinoma, but late carcinoma may be secondary. The author discusses precancerous lesions: ulcer, gastritis and the polypi accompanying pernicious anemia. He is convinced that any recurring gastric disturbances should be considered serious until otherwise diagnosed.

Dr. Gutmann stresses repeatedly the importance of well-taken roentgenograms and their proper interpretation in the diagnosis of early carcinoma of the stomach, which is often overlooked. He records his wide experience in its diagnosis and treatment. The text includes 155 illustrations, and there is an additional group of 348 more, all well done. There is a summary in English at the end of each chapter, which will facilitate the reading of this book.

CHARLES PIERRE MATHÉ, M.D.

L'Hemisphérectomie (Hemispherectomy). By E. Laine and Claude Gros. Paris: Masson et Cie, 1956. Pp. 134, with 31 illustrations.

This monograph is based on the authors' experiences during the past five years with 39 hemispherectomies. In 32 instances the procedure was carried out because of encephalopathy and in 7 because of tumor. There was an extensive angioma in 1 of the encephalopathic patients and thrombosis of the internal carotid artery in another. In the remaining 30 the encephalopathy dated from early in life.

The surgical technic is thoroughly described and well illustrated. The advisability of preserving the basal ganglia is thoroughly discussed, and the postoperative studies are thorough and well organized. Selection of cases, operative indications and contraindications, preoperative studies, and results are all thorough.

these experiments, regeneration proceeding from its normal edge toward the anastomosis.

THOMAS WILENSKY, M.D.

Sex Hormone Excretion After Bilateral Adrenalectomy and Oophorectomy in Patients with Mammary Carcinoma. Strong, J. A.; Brown, J. B.; Bruce, J.; Douglas, Mary; Kloppner, A. I., and Loraine, J. A., *Lancet* 1: 955, 1956.

The excretion of sex hormones by a post-menopausal patient before, during and after bilateral adrenalectomy and oophorectomy are described in this study, in detail and very commendably.

It is concluded that the small amount of hormone excreted by such a patient after an operation was not derived from adrenocortical tissue.

None of the patients responded to intravenous infusion of corticotrophin. The pattern of hormone excretion in patients who responded favorably to the operation did not differ from that in patients who showed no improvement after the removal of both adrenals and ovaries.

EDMUND LISSACK, M.D.

The Behavior of Carcinoid Tumors of the Intestinal Tract. Spain, D. M., *Am. J. Gastroenterol.* 26:162, 1956.

Carcinoid tumors may occur in any area of the gastrointestinal tract, involving the stomach and rectum on occasion. It is estimated that 1 per cent of all gastrointestinal tumors are carcinoids. Those examples of carcinoid that run a benign course cannot be differentiated on histologic grounds from those which infiltrate and ultimately metastasize. Carcinoid tumors are frequently malignant, but long survival in the presence of metastases is not uncommon. Benign carcinoid tumors may produce a variety of manifestations as a result of local involvement of the intestinal tract; e.g., obstruction, intussusception, diarrhea, hemorrhage, pain and loss of weight. It is estimated that from 80 to 95 per cent of all carcinoids are located in the region of the ileocecal valve; the most frequent site in the small intestine is the ileum. A biopsy specimen of rectal car-

cinoid may be mistaken for carcinoma, or may reveal no tumor cells because of the deep submucosal type of growth. A current concept is that all carcinoid tumors must be regarded as potentially malignant.

The syndrome associated with malignant carcinoid consists of predominantly right-sided valvular endocardial fibrosis, a peculiar type of cutaneous telangiectasia, cyanosis and blushing secondary to vasomotor changes and asthma-like symptoms due to bronchoconstriction. The substance responsible for this syndrome is believed to be a 5-hydroxytryptamine, regarded as a specific hormone of the enterochromaffin cell system and also elaborated in great quantities by carcinoid tumors. It is also present in the urine of patients with metastatic carcinoid. This is used as a diagnostic test. This substance is believed to be responsible for the attacks of flushing, the skin manifestations and the occasional asthmatic attacks that may occur in this syndrome. Attempts to reproduce the endocardial lesions experimentally in rabbits with 5-hydroxytryptamine have so far failed.

J. RICHARD MOORE, M.D.

Some Aspects of the Mechanics of the Abdomen. Adno, J., *South African M. J.* 30: 535, 1956.

This interesting and stimulating paper represents the results of the author's probes into the vast unexplored field of knowledge pertaining to the mechanics of the abdomen and the abnormalities that may result, at least in part, from disturbances and failures of the mechanical forces considered.

In order to record intraperitoneal, intragastric and intraurinary vesical pressures the author utilized a polythene catheter filled with physiologic solution of sodium chloride and an electrical strain-gauge attached to an amplifier and a recording unit. The readings were accurate, and a record of the slightest variation was readily obtained. With this apparatus the author was able to refute the generally held impression that the intra-abdominal pressure is negative. By this means he was able to demonstrate that the intraperitoneal pressure is positive except for a low-pressure area im-

1 100,000,000 c.c. *ie.*, 10^8 c.c. to 10^{-8} c.c. No serious attempts have been made to estimate the exact number of viable organisms in the inocula but in most cases it probably does not greatly exceed ten bacteria with the smallest inoculum and in some is undoubtedly less. For all tests 10 c.c. tubes of broth have been used and the results presented in the tables show the smallest inoculum giving full growth after 1 and 3 days' incubation at 37° C.

Experimental results

The pyogenic cocci In this group one strain of *Staphylococcus aureus*, two of *Streptococcus pyogenes*, one of *Streptococcus viridans*, three of *Diplococcus pneumoniae* representing the three best recognised types and one of *Neisseria intracellularis* were submitted to test. All were found susceptible to the influence of copper in broth in proportions comparable to those liable to be introduced in peptones. The results (table I) show that considerable strain variation of susceptibility to copper is possible, as witness the different degrees of sensitiveness of the two hæmolytic streptococci and the three pneumococci. This is quite in keeping with the common experience of bacteriologists that some strains of a given type of organism grow more readily than others in the same batch of broth. Different degrees of susceptibility to the quantity of copper in the medium may not be the sole explanation of such experiences but the results obtained with the copper-free controls in these experiments suggest that it may be the explanation in many instances.

The corynebacteria In this group the *gravis*, *mitis* and "intermediate" types of *Corynebacterium diphtheriae* described by Anderson, Happold, McLeod and Thomson (1931) were tested and also *Corynebacterium pseudodiphthericum*. As shown in table II all were found susceptible and among the diphtheria bacilli strain variation in sensitiveness to copper is also apparent.

The Gram-negative intestinal bacteria In sharp contrast to the preceding groups the Gram-negative intestinal bacilli *Escherichia coli*, *Eberthella typhosa*, *Salmonella paratyphi* and *Salmonella schottmuelleri* were found so resistant to the action of copper in the quantities liable to be introduced into media by peptones that they had to be tested on a higher range in order to discover inhibition.

In a series containing 4, 2 and 1 mg. Cu per cent. it was found that some inhibition could be detected with the smaller inocula on the first day's reading but with *S. paratyphi* alone was growth completely arrested at any dilution (table III). These organisms are apparently resistant to the action of copper to a degree which renders them free from inhibition by the quantities ordinarily found in media, an observation in complete accord with their known ease of cultivation in the laboratory. The results for

NEW, IMPROVED MUELLER-BALFOUR ABDOMINAL RETRACTOR



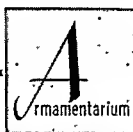
SU-3040—Complete .. \$75.00

Now the interchangeable, spring-tempered wire blades lock simply, but securely, in the side arms *without* thumb screws or other losable parts.

This versatile Retractor has the exclusive spring-latch construction and wide bar, notched for easy adjustability and permanent non-slip retention.

With its adaptability and its six interchangeable blades, the Mueller-Balfour Retractor is both a standard retractor and a deep retractor—in one instrument. Stainless steel.

As described in Armamentarium Vol. II, No. VIII.



MUELLER & CO.

330 South Monroe Street

Chicago 12, Illinois

Dallas • Houston • Los Angeles • Rochester, Minn.

SUBSCRIBE

to the

*Journal, International
College of Surgeons*



For details see

"INFORMATION"

Page XVIII

THE
IMPROVED

Padgett-Hood
DERMATOME



**SIMPLIFIES
SKIN
GRAFTING**

Accurate and uniform grafts up to 4 inches wide, 8 inches in length. Inexpensive **THROW-AWAY BLADES, DERMATOME TAPE**, and other accessories available for all models.

Write Today for Complete Information

KANSAS CITY ASSEMBLAGE CO.
876 LOCUST • KANSAS CITY, MO.

TABLE III
Gram-negative intestinal bacilli

ence of quantity of copper in broth on growth of varying inocula Smallest inoculum in c c giving full growth after 1 and 3 days' incubation Results expressed as powers of 10

rganism	1 day's incubation					3 days incubation						
	Mg Cu per cent. in broth				Controls, Cu free	Mg Cu per cent. in broth						Controls, Cu free
	4 0	2 0	1 0			4 0	2 0	1 0				
<i>E. coli</i>	-6	-8	-8		-8	-8	-8	-8				-8
<i>E. typhosa</i>	-2	-2	-5		-8	-8	-8	-8				-8
<i>S. paratyphi</i>	-4	-4	-6		-8	-7	-7	-8				-8
<i>S. schottmuelleri</i>	-5	-6	-7		-8	-8	-8	-8				-8
	Mg Cu per cent. in broth				Controls, Cu free	Mg Cu per cent. in broth						Controls, Cu free
	1-0	0 5	0 25	0 125		1 0	0 5	0 25	0 125	0 0025		
<i>S. dysenteriae</i>	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
<i>S. paradydenteriae</i> (Flexner)	-2	-2	-4	-5	-6	-6	-7	-8	-8	-8	-8	-8
<i>V. comma</i>	-1	-3	-3	-4	-4	-2	-3	-3	-4	-5	-5	-5



The Journal of the International College of Surgeons

FOUNDED IN GENEVA, SWITZERLAND, 1935, BY DR. ANDRÉ CROTTI
INCORPORATED IN WASHINGTON, D. C., 1940

Vol. XXVII

MAY, 1957

No. 5

General Surgery

Degastroenterostomy

JOSEPH E. BELLAS, M.D., F.A.C.S., F.I.C.S., D.A.B.

PEORIA, ILLINOIS

DEGASTROENTEROSTOMY—removal of a gastroenterostomy—is an operation that ought to be obsolete, but until the results of gastric operations attain a level of 100 per cent effectiveness, it will behoove surgeons to retain an intimate familiarity with this procedure.

Indications.—In discussing degastroenterostomy, one must assume that gastroenterostomy has been done for peptic ulcer, real or phantom. Degastroenterostomy consists of removing an existing gastroenterostomy for the following indications: (1.) malfunction of the anastomotic stoma, (2.) secondary peptic ulcer occurring at or about the stoma, or (3.) gastrojejunoecolic fistula.

1. Malfunction of a gastroenterostomy includes (a) vicious circle, (b) a contracted stoma with gastric retention and (c) a wide open stoma without vicious circle complications, without secondary peptic ulcer but with gastric retention.

In most instances the cause of malfunction can be traced to an improper indication for the operation or improper performance of the anastomosis. Occasionally, however, despite proper indications and performance, patients have disturbing symptoms due to gastric retention, regardless of an open stoma and the absence of secondary peptic ulcers. This condition was formerly known to surgeons as "gastroenterostomy disease" for lack of a better name. I suppose that the disturbance is associated with imbalance of the neuromuscular apparatus of the stomach, but I confess that this may be just an-

Read before the Illinois Surgical Society, Galesburg, Aug. 25, 1956, the Illinois Chapter of the American College of Surgeons, Belleville, Sept. 29, 1956, and the North Central Illinois Medical Association, Princeton, Nov. 18, 1956.
Submitted for publication Feb. 11, 1957.

TABLE III

Gram-negative intestinal bacilli

Influence of quantity of copper in broth on growth of varying inocula Smallest inoculum in c c giving full growth after 1 and 3 days' incubation Results expressed as powers of 10

Organism	1 day's incubation					3 days' incubation				
	Mg Cu per cent. in broth				Controls, Cu free	Mg Cu per cent. in broth				Controls, Cu free
	4.0	2.0	1.0	0.5		4.0	2.0	1.0	0.5	
<i>E. coli</i>	-6	-8	-8	-8	-8	-8	-8	-8	-8	-8
<i>E. typhosa</i>	-2	-2	-5	-5	-8	-8	-8	-8	-8	-8
<i>S. paratyphi</i>	-4	-4	-6	-6	-8	-7	-7	-8	-8	-8
<i>S. schottmuelleri</i>	-5	-6	-7	-7	-8	-8	-8	-8	-8	-8
	Mg Cu per cent. in broth				Controls, Cu free	Mg Cu per cent. in broth				Controls, Cu free
	1.0	0.5	0.25	0.125		1.0	0.5	0.25	0.125	
<i>S. dysenteriae</i>	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
<i>S. paradysenteriae</i> (Flexner)	-2	-2	-4	-5	-6	-6	-7	-8	-8	-8
<i>V. comma</i>	-1	-3	-3	-4	-4	-2	-3	-4	-5	-5

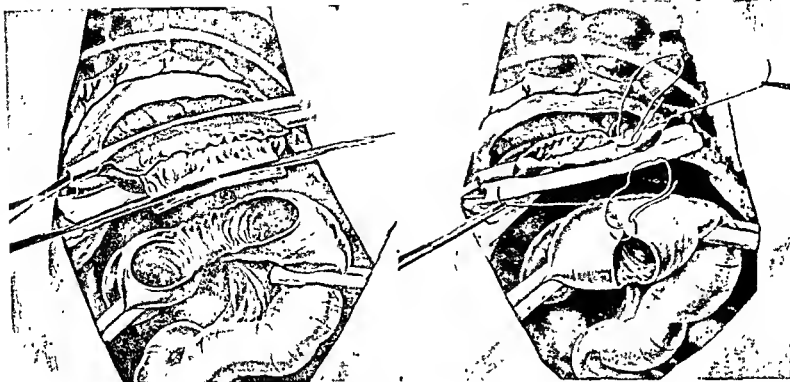


Fig. 5.—*Left*, degastroenterostomy and excision of gastrojejunal stoma. *Right*, reconstruction of jejunum. (After Spivack.)

This maneuver, coupled with the use of Upjohn's mycfradin, which sterilizes the intestinal contents, permits the inevitable inflammatory reaction around the fistulas to subside materially. During the interval of three or four months before the second stage, this patient lost his toxic feeling and appearance and began to believe that there was some hope. The presence of the colostomy is admittedly a nuisance during the entire course of the management, but it must be borne. A course of mycfradin was given for three or four days before the second stage.

In the second stage one will encounter many adhesions in and around the fistulas, and they must be reduced so that one can identify the abnormal fistulas. This is particularly difficult if a retrocolic gastrojejunostomy has been done, as in this case. I noted that the location of the gastrojejunal anastomosis is most easily found and its disengagement most readily performed if one enters the lesser peritoneum through the gastrohepatic omentum first. The attachment of the trans-

verse mesocolon to the stomach must be separated, with constant awareness that the middle colic artery must not be injured. Manipulation, from above as well as from below the transverse mesocolon, will keep one more conscious of the relations and will reduce this hazard. The stomach above the anastomosis is divided between two crushing clamps so as to liberate the gastrojejunal anastomosis, still attached to the jejunum, at the expense of the stomach (Fig. 2).

The site of the jejuncolic fistula is then cleared of adhesions, and two series of clamps are placed in wedge-shaped fashion over the transverse portion of the colon on each side of the fistula beyond the limits of palpable induration. The defect in the transverse portion of the colon is then sutured in a transverse direction. Because of the diversion of the fecal current by the ascending colostomy and the sterilizing effect of the mycfradin, one need not fear contamination (Fig. 4).

The jejunal loop is then opened, ar areas of the gastric

TABLE IV
Miscellaneous aerobic organisms Smallest inoculum in c.c. giving full growth after
growth of varying inocula Smallest inoculum expressed as powers of 10

Influence of quantity of copper in broth on growth of varying inocula Smallest inoculum																	
1 and 3 days' incubation Results expressed as powers of 10																	
Organism.	1 day's incubation							3 days incubation							Controls, Cu free		
	Mg Cu per cent in broth							Mg Cu per cent in broth									
	0.5			0.25		0.125		0.5			0.25		0.125			0.0625	
	1.0	No growth	No growth	No growth	0	-1	-1	1.0	No growth	-1	-2	0	-1	-3		-8	0.0625
<i>B melitensis</i>	No growth	No growth	No growth	No growth	-1	-1	-2	No growth	-1	-8	-8	-2	-8	-8	-8	-8	
<i>P cauxseplica</i>	No growth	No growth	-1	-4	-8	-8	-8	-1	-2	-6	-8	-3	-8	-8	-8	-8	
<i>B subtilis</i>	No growth	-1	-5	-8	-8	-7	-8	-2	-3	-8	-8	-8	-8	-8	-8	-8	
<i>P vulgaris</i>	-1	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	
<i>P aeruginosa</i>	-5	-5	-5	-5	-5	-6	-6	-8	-8	-8	-8	-8	-8	-8	-8	-8	

TABLE V

TABLE V	
Anaerobic bacteria	Smallest inoculum in c.c. giving growth
Influence of quantity of copper in broth on growth of varying inocula	Smallest inoculum in c.c. giving growth
Results expressed as powers of 10	
Influence of quantity of copper in broth on growth of varying inocula	
after 3 days' incubation	3 days incubation

Results expressed as powers of 10				
Organism.	3 days incubation			
	Mg Cu per cent in broth			
	0.5	0.25	0.125	0.0625
<i>Cl tetani</i>	-5	-6	-5	-6
<i>Cl welchii</i>	-2	-3	-3	-3
				Controls, Cu free
				-7
				-8

Studies of the Use of Glyco-Algin as a Solution for Transfusion

TANZO TAKAYAMA, M.D., F.I.C.S.*

SAPPORO, JAPAN

THE transfusion of fluids is administered mainly to achieve two ends: first, to restore the water deficiency of the body, and second, to supplement nutritional deficiencies. In addition, transfusion is employed to treat shock induced by severe trauma or major operations, and also as a blood substitute or an expander of plasma volume. In other words, various fluids are administered by transfusion to chronically dehydrated patients preoperatively, during operation and postoperatively, especially when the amount of blood required for transfusion is not available in cases of unsuspected great emergency and/or when various nutrients must be supplied.

Hitherto saline solution, Ringer's solution and 5 per cent dextrose have been commonly used to restore body fluids. It has been revealed recently, however, that a limit exists to the amount of fluid administered and that saline solution causes a disturbance in water metabolism, influences the electrolyte balance and, above all, may be the cause of pulmonary edema and other dangerous complications. To counteract these, Darrow's solution, Dextran and other medicaments have been introduced. Nevertheless, the problem of fluid transfusion has become more urgent with the progress of operative technic and the increase in the number of operations performed.

With the foregoing facts in mind, I have made chemically pure Glyco-Algin from sodium alginate, to be used in transfusions for dehydration, as a blood substitute and as a so-called plasma volume expander (Bowman).

These studies were begun in 1948 and completed in 1951.

Chemical and Biologic Properties of Sodium Alginate: Alginic acid, a polymer of a mannuronic acid, is chemically a polysaccharide and has a high molecular weight. Sodium alginate has a colloidal property, is soluble in water and has high viscosity. The structure of alginic acid is shown in Figure 1.

Glyco-Algin is prepared by dissolving 0.3 per cent sodium alginate in 5 per cent dextrose solution. It is adjusted to maintain a specific viscosity of 2 and a molecular weight of 15,000. This is because polysaccharides of high molecular weight, such as Dextran, have an unfavorable influence on the living body; moreover, solution of sodium alginate alone has been verified as having a somewhat ill effect on hemotasis.

When mature rabbits were bled at the rate of 20 cc. per kilogram of body weight in six minutes, the blood pressure dropped rapidly. With the systolic pressure at 100 prior to bleeding, the changes of blood pressure appeared as in Figure 2. The rabbits were then given transfusions of Ringer's solution, dextrose solution, alginate saline solution and Glyco-Algin respectively, in an amount equal to the blood removed, and the results compared with data on groups that received no transfu-

*Chief, Department of Surgery, Sapporo Medical School, Sapporo.

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.

Submitted for publication Sept. 12, 1956.

TABLE VI
Smallest inoculum in cc

Comparison of meat extracts in relation to copper in media using <i>S. aureus</i> for results expressed as powers of 10 giving full growth after 1 and 3 days' incubation													
		1 day's incubation						3 days incubation					
		Mg Cu per cent in broth						Mg Cu per cent in broth					
		Controls, Cu free						Controls, Cu free					
		1.0	0.5	0.25	0.125	0.0025		1.0	0.5	0.25	0.125	0.0025	
Meat extract.		0	-2	-3	-5	-7	-8	0	-2	-8	-8	-8	-8
Ox heart Commercial		0	-2	-2	-3	-3	-5	-1	-2	-3	-8	-8	-8

TABLE VII	Smallest inoculum giving full growth after
pyogenes for test	Results expressed as powers of 10
of serum on copper in media using Str	Incubation

Influence of serum on copper in media using Str pyogenes for test									
Results expressed as powers of 10									
1 and 3 days' incubation									
1 day's incubation									
3 days incubation									
Medium	Mg			Cu per cent. in broth			Controls, Cu free		
	1.0	0.5	0.0025	1.0	0.25	0.0025	1.0	0.25	0.0025
	0	-1	-4	0	-2	-8	0	-3	-8
No serum 5 per cent rabbit serum added	Mg			Cu per cent. in broth			Controls, Cu free		
	1.0	0.5	0.0025	1.0	0.25	0.0025	1.0	0.25	0.0025
	0	-1	-8	0	-1	-8	0	-2	-8

factors that may influence the problem of limitation of rapid transfusion.

These results were also verified by myocardiographic studies. While rapid transfusion adversely influenced the width of the myocardiogram, slow transfusion of 10 minims (Fig. 6) of Glyco-Algin, ninety minutes after bleeding, resulted in readings one and three-tenths as wide as those taken prior to bleeding, indicating efficient contraction of the heart.

The influence of Glyco-Algin transfusion on renal function is as follows:

1. Though the value for urine clearance increased gradually after transfusion of Glyco-Algin and returned to normal after twenty-four hours, the variation was within the normal physiologic range; hence it may be concluded that Glyco-Algin has no adverse influence on the kidney.

2. Though the output of urine decreases temporarily after bleeding, it gradually increases as transfusion is started slowly (10 minims; see Fig. 7) and is restored to normal after thirty minutes. In addition, a further increase was observed parallel with the transfusion of Glyco-Algin. When rapid transfusion was administered with alginate saline solution, anuria occurred after sixty minutes. Both Glyco-Algin and Ringer's solution tended to reduce the amount of urine, although a temporary increase was observed in the early stages.

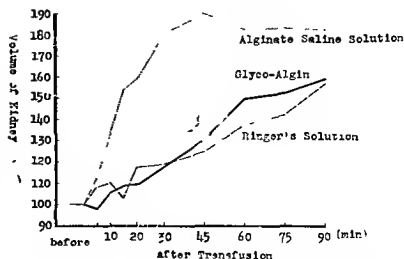


Fig. 9.—Enlargement of kidney with rapid transfusion.

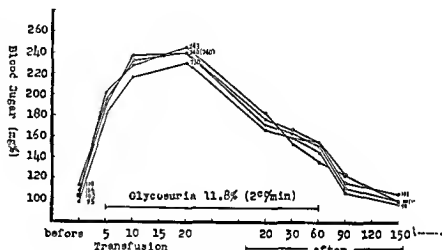


Fig. 10.—Effects on blood sugar level.

3. As to enlargement of the kidney, this was noted in all cases of transfusion. In the case of slow transfusion (10 minims) of Glyco-Algin a 10 to 20 per cent increase

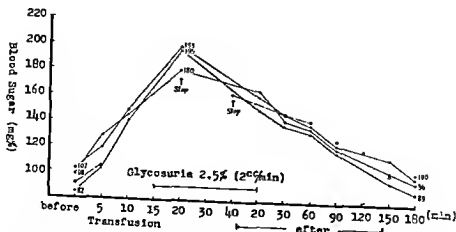


Fig. 11.—Comparative effects of Glyco-Algin and other transfusion fluids on blood sugar level in slow and rapid transfusion.

broth provided that proper precautions were taken for the exclusion of copper. In many instances exclusion of copper is by itself sufficient to ensure free growth from even the smallest inocula.

The influence of serum is noteworthy. It is a very active antagonist of copper and an important part of the benefit derived from its addition to broth is in all probability referable to this antagonism. That serum neutralises the inhibitory action of certain amino-acids on bacterial growth is well known from the work of Gordon and McLeod (1926). It is probable that it also protects bacteria from the harmful influence of salts, such as sodium chloride, which are known to exert some bactericidal action on suspensions of bacteria. The influence of serum as a beneficial addition to broth would therefore appear to depend to a notable extent on its property of neutralising the activity of those substances in media which are harmful to bacteria.

Summary

Representative types of the commoner pathogenic bacteria have been tested for sensitiveness to the concentrations of copper liable to be introduced into nutrient broth by peptones.

With the exception of certain Gram-negative bacilli, which have never presented any serious difficulty in cultivation, all the organisms tested have been adversely affected by these copper concentrations. In copper-free media growth from very small inocula was found possible with most of the pathogens investigated.

The action of copper is neutralised by serum. It is concluded that with the removal of copper from peptones a greater uniformity of bacteriological media will be possible.

REFERENCES

- | | | |
|------------------------------------|------|---|
| ANDERSON, J S, HAPFOLD, F C, | 1931 | this <i>Journal</i> , xxxiv 667 |
| McLEOD, J W, AND THOMSON, J G | | |
| FERNBACH, A | 1936 | 2nd Internat Congr Microbiol, London, Abstract of Communications, p 253 |
| GORDON, J, AND McLEOD, J W | 1926 | this <i>Journal</i> , xxix 13 |
| HUNTOON, F M | 1918 | <i>J Inf Dis</i> , xxiii 169 |
| LOCKE, A, AND MAIN, E R | 1930 | <i>Ibid</i> , xlv 393 |
| McINTOSH, J, AND FILDES, P | 1916 | <i>Lancet</i> , i 768 |
| O'MEARA, R A Q, AND MAC SWEEN, J C | 1936 | this <i>Journal</i> , xliii 373 |
| POPE, C G, AND PINFIELD, S | 1932 | <i>Brit J Exp Path</i> , xiii 60 |
| WILSON, G S | 1928 | this <i>Journal</i> , xxxi 113 |
| WRIGHT, H D | 1933 | this <i>Journal</i> , xxxvii 257 |

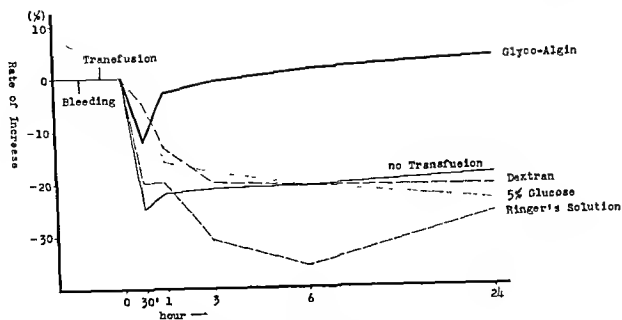


Fig. 16.—Effects on erythrocyte count.

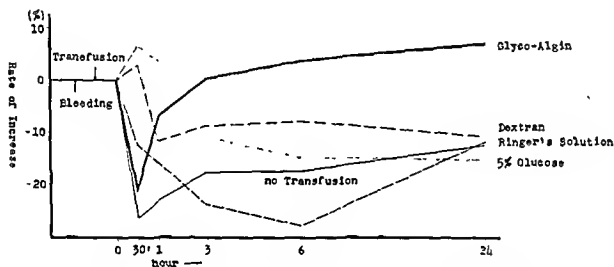


Fig. 17.—Effects on total protein content of blood plasma.

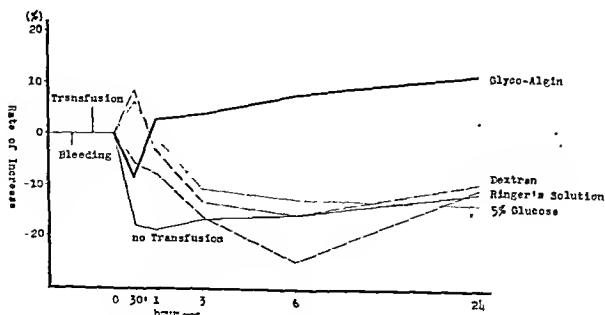


Fig. 18.—Effects on total circulating blood volume.

heated blood agar (Anderson *et al.*, 1931) Dudley, May and O'Flynn (1934) point out that the differentiation of the types described by the Leeds group of workers is easier on media containing serum from rabbit or sheep than with that from other animals

In spite of all these studies there are practically no quantitative experiments on record to indicate the optimum medium for the isolation and typing of diphtheria bacilli and many of the media described are complicated and difficult to prepare. A preliminary study of the points involved was made by Abdalla (1935). This has now been extended with a view to devising a medium which contains a simply prepared substrate with the optimum concentration of inhibitory salt and the most suitable enrichment. The results of this further study are recorded in this communication.

Methods

The strains used for these experiments were grown on Loeffler's medium for 18 hours at 37° C and then emulsified in a diluting fluid containing 0.85 per cent of sodium chloride, 0.15 per cent disodium hydrogen phosphate and 0.1 per cent gelatin adjusted to pH 7.476 in a wide test tube (6" x 1") to an opacity approximately equivalent to that of a suspension of *B. coli* containing one thousand million organisms per c.c. From this a series of decimal dilutions was prepared in the same diluent and of the selected dilutions loopful inocula were evenly spread over half the surface of a plate of the test or control media, duplicate observations being made in each case. The efficiency of the media was judged by the number of colonies which ultimately developed, the size which they attained, the time at which they became evident and the degree of development of the type characteristics. The control medium throughout has been 6 per cent horse blood agar, the agar basis being prepared as described by Wright (1933, 1934). The time of incubation has perforce varied in different experiments owing to the different rates of development of the different strains and on the different media.

Inhibition of growth of C. diphtheriae on agar by potassium tellurite

Experiments were carried out with two selected strains of diphtheria bacilli. Preliminary observations had shown that one of these (G 993) was relatively resistant to inhibition by the salt and that the other (M 819) was much more susceptible. A series of dilutions of suspensions of these organisms was inoculated on to agar plates containing varying concentrations of potassium tellurite, on control plates of agar without tellurite and on blood agar. These were observed at intervals up to four days and the number of colonies recorded. The results will be found in table I which gives the number of colonies which developed without reference to the time at which they appeared.

It will be seen that small inocula of both strains were completely inhibited on agar containing quite low concentrations of the salt

method often used earlier, i.e., "pulling the urethra" through a canal made in the glans, with a pointed scalpel, originated with Thompson-Walker. Today hypospadias glandis can be cured by the creation of a new urethra. All operations aiming at correction of the original urethra by pull-through or relocation are obsolete, because no improvement is thereby made in the deformity of the penis.

A brief summary of the development of the hypospadias therapy and a description of a new method of operation, in which the urethra is replaced by means of transplantation of the mucous membrane of the bladder.

History.—Nove-Josserand, in 1897, used scrotal grafts for replacement of the deficient urethra. He used Thiersch graft lobes, which he transplanted into a canal of the pars pendula prepared in advance. About 1900, surgery made sensational progress in the field of tissue plastics. What was virtually a race, aiming at the best substitute for the deficient urethra, began at once. Creevy stated that scrotal skin was unsuitable for making a urethra, since hair grows into it, forming stones. Edmund then used skin from the prepuce, with success. Nesbit and also Davis used the skin from the dorsum of the penis, which they transplanted to the ventral surface. Some surgeons used skin from the penis as well as from the scrotum. Many satisfactory results were obtained, since the skin in this region is hairless, pliant and elastic. The use of pedicled skin grafts from the surrounding skin was attempted, but this was soon given up, since the skin of the prepuce was more easily available. Russell formed a tunnel of the skin of the prepuce and later pulled the glans through.

Free transplantations, which at one time were performed frequently, have been dropped altogether. A great many experiments have been made to transplant

entire cavernous organs, such as the appendix, the ovarian tubes, or a vein; skin also has been used for making a new urethra, as well as Thiersch's lobes and the vagina. Good initial results were obtained with all this material, but this kind of transplant was absorbed and replaced with scar tissue. Masson used Thiersch's lobes with some success but encountered many failures due to disruption of the transplant by coagulated blood. Schieden, in 1919, was the first to use the urethra from another human being. Lexer, in 1911, made use of the appendix. In 1910, Tanton attempted to use a vein for transplantation and Legueu experimented with the *mucous membrane of the vagina*. He succeeded in making a canal but abandoned the method, as the vagina could not be adapted to the constitution of a urethra. All attempts at using extraneous material are doomed to failure since such transplants are biologically intolerable.

The most common operations used at present include:

Hamilton Russell's "stole" operation. This is performed in four stages, in which an incision is made through the frenum that binds down the penis, and the glans is tunneled with a tenotomy knife. Incisions are then made laterally in two lines; a strip of prepuce like a clergyman's stole is thus marked out, and finally the flaps forming the urethra are sutured. Davis uses the skin from the dorsum of the penis and adds the prepuce if needed. Ombredanne's operation is recommended by some surgeons. Bidder incises the ventral aspect of the penis on both sides, forming the urethra from the skin of the penis and the floor from scrotal skin. This operation is adequate for peniscrotal hypospadias. Denis-Browne uses the skin of the penis, which is supposed to possess, among other advantages, the quality of not forming keloids. In addition, he the prepuce. A perinea

enriched media than in nutrient agar without enrichment. Blood is a superior enrichment to serum both from the point of view of the numbers of colonies which develop and of the time of their appearance. The fast-growing strain G 993 showed no appreciable loss of colonies with 0.04 per cent of potassium tellurite either on serum agar or blood agar, but whereas the colonies on serum agar reached a diameter of 1 mm in 48 to 72 hours, on blood agar they had attained this size in 18 hours. The advantage of the enrichment with blood was even more marked with the delicate strain M 819. Further experiments were therefore confined to blood agar media.

TABLE II
Effect of enrichment on inhibition by potassium tellurite

Medium.	Strain	Number of colonies developing from 1 loopful of a selected dilution								
		Blood agar (control)	Concentration of potassium tellurite in medium (per cent.)							
			0.0	0.01	0.02	0.03	0.04	0.06	0.08	0.16
Agar	G 993	200+	200+	75	58	69	37	0		
	M 819	118	105	0		0	0	0		
Serum agar	G 993	60	64		36		53		32	
	M 819	200+	195		155		0		0	
Blood agar	G 993	200	200		200		150		103	36
	M 819	79	79		82		57		0	0

From table II it is evident that 0.04 per cent of potassium tellurite in blood agar has only a slight inhibitory effect even on delicate strains of diphtheria bacilli but with 0.08 per cent the number of colonies which develop is small as compared with the control plate. In further experiments to determine the highest permissible concentration it was found both with these strains and with six others tested in the same way that 0.06 per cent of the salt produced slightly more inhibition than 0.04 per cent. Concentrations above 0.06 per cent begin to exert a very marked inhibitory action. Fifty field cultures tested on 0.04 and 0.06 per cent tellurite blood agar revealed very little difference between the two concentrations in relation to ease of isolation and recognition of the diphtheria colonies, though on the lower concentration they developed somewhat more quickly.

Inhibition of growth of other organisms by potassium tellurite

The preceding experiments indicate that the highest permissible concentration of potassium tellurite for the isolation of diphtheria bacilli is 0.06 per cent. It remained to determine what was the effect of this concentration on the other organisms likely to be encountered in swabs from diphtheria patients. When cultures

from the former urethra and the new vesical graft, a graft was taken from the scrotum to cover the new urethra and was sewed onto it. (Fig. 1E). When the bladder healed, it was necessary to put a catheter into the newly formed urethra. As a result of this, urethritis and pain occurred; it was obvious that the child could not tolerate a catheter, so a "boutonniere" was created and the catheter removed from the urethra. Through this passage undisturbed healing occurred and the final result was satisfactory (Fig. 1G). The boy has been under observation for a long time and urinates in a good stream without difficulty. Dilation of the urethra was performed without difficulty, and no stenosis or stricture has occurred in seven years.

It was my impression at first that this operation was suitable only for children, in view of the fact that changing states of fullness of the corpora cavernosa would disturb such a plastic procedure. Successful results, however, have been obtained in 2 adult patients. The case of 1 of these is here reported.

CASE 2.—A 34-year-old man was admitted to hospital with a history of gonorrhea ten years earlier, followed by prostatic abscess that ruptured into the rectum during an examination with the patient under anesthesia. Both urine and feces had been diverted from their natural passages. In addition to the fistula between the rectum and the bladder, there was hypospadias of the pars pendula of the penis (Fig. 2A). Many operations had been done to close the hypospadias, but without success, so that when I first saw the patient the whole penile section was transformed into thick scar tissue, with the large hypospadiac opening of the urethra (Fig. 2B).

Operative Technic.—The rectovesical fistula was first repaired by cutting circularly around the anus, the incision penetrating in all directions into the periproctytic tissue. The rectum was freed and the sphincter isolated. The rectum was brought out through the anus, so that the old scarred fistula in the rectum was placed exterior to the anus. The sphincter was sutured carefully around the rectum and the exteriorized portion cut off. (This was a modification of the Rothenegg operation.) A catheter was introduced into the bladder, and in about four weeks the rectum was completely healed. The hypospadias op-

eration was then performed in the manner described (Fig. 2, C and D). The patient was followed for eight years and has had no trouble with urination or with rectal complaints since the last operation. When he was last examined erection and ejaculation were normal, the urine was clear, urination with a good stream was habitual (Fig. 2, E and F). Periodic dilation was done after the operation.

COMMENT

The mucous membrane of the bladder has been used as a transplant in the cure of hypospadias because of the good nutrition of the graft and its physiologic ability to conduct urine. It is not necessary, in this operation, to divert the urine through a perineal urethrostomy, but it is done through a cystostomy, which also has the advantage that the material for the graft is immediately at hand. There is no other organ so rich in mucous membrane, so elastic and so much inclined to heal easily as the bladder. Modern methods of operation take this quality into consideration. It is possible to extirpate much of the bladder and find, a few weeks later, that the walnut-sized remainder has become once more an organ of almost normal capacity. One should not hesitate, therefore, to cut large grafts from the anterior wall in order to obtain surplus material for a plastic operation. Although it is true the tubular graft material does not usually shrink—which is quite a contrast to what occurs with a free transplant—it is a good thing to suture without tension and to build the tube without a drain. The mucous membrane of the urethra and bladder will easily heal per primam, in view of the fact that they are cognate mucous membranes and do not have to perform any function that is new to them.

The nutrition of the graft is ample, so that there is no danger of necrosis. Severe purulent cystitis is a contraindication to this procedure, but mild cystitis or mild edema of the mucous membrane need not

agar containing 0.06 per cent potassium tellurite inoculated from field cultures on Loeffler serum slopes that heavy growths are obtained only if *C. diphtheriae* or other diphtheroids or *M. tetragenus* are present. Sometimes, however, the number of streptococci placed on the plate is so large that some colonies develop.

There is usually no difficulty in distinguishing the colonies of these organisms on this medium. *M. tetragenus* colonies are very dark and tenacious; those of other cocci are usually small but may bear a superficial resemblance to the intermediate type of diphtheria bacillus, though they are much darker at 24-hours' incubation and distinguishable from them. The diphtheroids vary a good deal and some five types of colony have been noted, one yields a large smooth smoky colony resembling some strains of *mitis* diphtheria, another a large rough colony which emulsifies badly. A third type is a small, smooth, flat form, a fourth small, pale and convex, and a fifth small, flat and rough and not unlike that of the "intermediate" type of *C. diphtheriae*. Most of the colonies are smaller and paler than those of diphtheria bacilli and can be readily distinguished but in some cases the confirmatory fermentation tests are necessary. The first two types of diphtheroid bacilli ferment sucrose, the last three neither sucrose nor glucose. It may be mentioned that, in the examination of 70 ear swabs many of which contained proteus organisms, in no case has the isolation of *C. diphtheriae* been in any way interfered with by the spreading growth of this organism.

The effect of different kinds of blood on type differentiation

As pointed out by Dudley, May and O'Flynn the type characteristics of the diphtheria bacilli can be demonstrated on suitable media in the absence of tellurites. Plates containing 6 per cent of sheep blood, horse blood and rabbit blood respectively were inoculated with various strains of the three recognised types and examined with a Leitz binocular dissecting microscope after 24, 48 and 72 hours' incubation at 37° C. The type characteristics were pronounced on all these media but somewhat less satisfactorily on horse blood than on the others. The plasma and cells of the three kinds were then separately incorporated in nutrient agar and similarly tested. On horse plasma the differentiation was extremely poor but with horse blood cells and with both plasma and cells of rabbit and sheep blood it was quite satisfactory. Although the differentiation is quite good on horse blood agar it has been observed that the addition of 0.04 per cent potassium tellurite to this medium renders it unsatisfactory. The growth of all types is retarded and strains of the *gravis* type fail to produce the typical daisy-head appearance. Horse blood agar containing 0.1 per cent potassium

many of the complications encountered in the past should be lessened. General anesthesia seems to have definite advantages over local anesthesia with regard to complications.

In 1952, Abbott, Gay, and Goodall⁵ reported the complications in 174 cerebral arteriographic procedures. Most of these were of cerebral vascular origin, with temporary or permanent hemiplegia, aphasia, hemianopsias, convulsions and even death. Extracranial complications were cervical hematoma necessitating tracheotomy, severe irritation of the soft tissue, with fever and pain, hoarseness, transitory diffuse punctate hemorrhages of the face and neck and radiculitis of the cervical roots (from the taking of a vertebral arteriogram). Horner's syndrome, temporary and permanent, was occasionally encountered. The authors considered the complications due to mechanical factors, vasospastic factors, disturbance of the blood-brain barrier, air or blood clot embolism and sensitivity to drugs. Hypaque has not been used long enough to justify evaluation of the complications it may cause, and the extracranial complications should be essentially the same; the more serious cerebral complications, however, should be encountered less often.

With better angiographic technic aiding

in the diagnosis of intracranial aneurysmal lesions, improved surgical methods have necessarily followed. Better surgical technic, careful selection of patients and the time of operation, and hypotensive anesthesia have all helped lower surgical mortality and morbidity rates. As time goes on, experience with the management of these lesions will certainly lead to many more cures.

Saccular intracranial aneurysms may be grouped, according to location, into those of the infracaloid part of the internal carotid artery, those of the supracaloid part of the internal carotid artery, those on or about the circle of Willis, those of the peripheral part of the major cerebral vessels and those in the posterior fossa. The arteriovenous malformations will be briefly discussed.

The symptoms and treatment of these saccular aneurysms vary with their various sites and will be discussed according to location.

Infracaloid Aneurysms of the Internal Carotid Artery.—Infracaloid aneurysms of the internal carotid artery occur on the cavernous part of the artery. These aneurysms are usually large, saccular lesions, causing symptoms because of compression of the adjacent structures or by rupture into the cavernous sinus, produc-

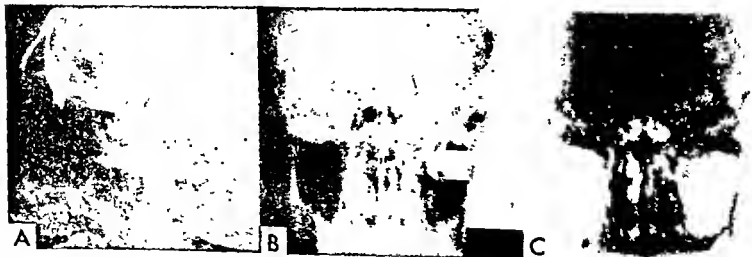


Fig. 1 (Case 1).—A, arteriogram showing arteriovenous fistula between intracranial carotid artery and cavernous sinus. (Note large amount of dye in the region of cavernous sinus and dilated ophthalmic vein.) B, left carotid arteriogram showing dye in cavernous sinus (lateral view). C, normal right cerebral arteriogram of same patient for comparison.

agar containing 0.06 per cent potassium tellurite inoculated from field cultures on Loeffler serum slopes that heavy growths are obtained only if *C. diphtheriae* or other diphtheroids or *M. tetragenus* are present. Sometimes, however, the number of streptococci placed on the plate is so large that some colonies develop.

There is usually no difficulty in distinguishing the colonies of these organisms on this medium. *M. tetragenus* colonies are very dark and tenacious; those of other cocci are usually small but may bear a superficial resemblance to the intermediate type of diphtheria bacillus, though they are much darker at 24-hours' incubation and distinguishable from them. The diphtheroids vary a good deal and some five types of colony have been noted, one yields a large smooth smoky colony resembling some strains of *mutis* diphtheria, another a large rough colony which emulsifies badly. A third type is a small, smooth, flat form, a fourth small, pale and convex, and a fifth small, flat and rough and not unlike that of the "intermediate" type of *C. diphtheriae*. Most of the colonies are smaller and paler than those of diphtheria bacilli and can be readily distinguished but in some cases the confirmatory fermentation tests are necessary. The first two types of diphtheroid bacilli ferment sucrose, the last three neither sucrose nor glucose. It may be mentioned that, in the examination of 70 ear swabs many of which contained proteus organisms, in no case has the isolation of *C. diphtheriae* been in any way interfered with by the spreading growth of this organism.

The effect of different kinds of blood on type differentiation

As pointed out by Dudley, May and O'Flynn the type characteristics of the diphtheria bacilli can be demonstrated on suitable media in the absence of tellurites. Plates containing 6 per cent of sheep blood, horse blood and rabbit blood respectively were inoculated with various strains of the three recognised types and examined with a Leitz binocular dissecting microscope after 24, 48 and 72 hours' incubation at 37° C. The type characteristics were pronounced on all these media but somewhat less satisfactorily on horse blood than on the others. The plasma and cells of the three kinds were then separately incorporated in nutrient agar and similarly tested. On horse plasma the differentiation was extremely poor but with horse blood cells and with both plasma and cells of rabbit and sheep blood it was quite satisfactory. Although the differentiation is quite good on horse blood agar it has been observed that the addition of 0.04 per cent potassium tellurite to this medium renders it unsatisfactory. The growth of all types is retarded and strains of the *gravis* type fail to produce the typical daisy-head appearance. Horse blood agar containing 0.1 per cent potassium

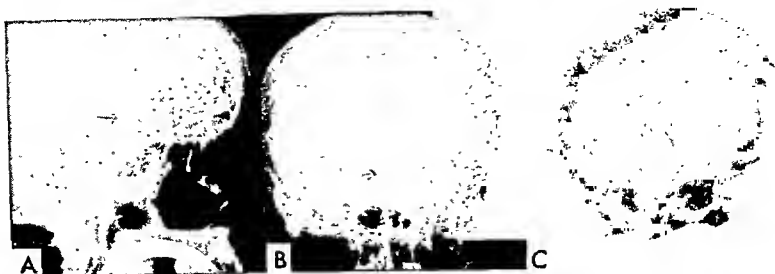


Fig. 5 (Case 6).—A, right arteriogram showing aneurysm of anterior communicating artery. B, anteroposterior view. C, oblique view.

days after the arteriographic investigation, with complete relief of pain. There was no further drooping of the eyelid, but the inability to abduct the left eye persisted. This patient was seen one year after the operation. She had remained free of pain, but the abducens paralysis was still evident.

Supraclinoid Aneurysms of the Internal Carotid Artery.—Walker,¹⁵ in reviewing 285 cases of intracranial aneurysms, observed that 71 verified aneurysms of the internal carotid artery had occurred above the clinoid process. He noted that headache or pain in the head was the most common complaint and was present for periods varying up to many years before the development of a subarachnoid hemorrhage, which occurred in 46 of the 71 patients. Half of the patients who had subarachnoid hemorrhages had no warning. In Walker's group of patients, failing vision and hemiplegia were the next most common symptoms. Diplopia is fairly frequent and is most often due to involvement of the oculomotor nerve but may be due to involvement of the trochlear or abducens nerve. Occasionally, papilledema is present.

Surgical treatment of supraclinoid aneurysms of the carotid artery consists mainly of cervical ligation of the internal carotid artery, which is probably inadequate

alone; or this combined with ligation of the internal carotid artery intracranially; and clipping of the neck of the aneurysm.

Case 4 illustrates a large ruptured aneurysm of the supraclinoid internal carotid artery that was treated by the trapping method. The internal carotid was ligated in the neck, and a clip was applied to the internal carotid intracranially, distal to the aneurysm.

CASE 4.—A 68-year-old white woman had sudden, severe headache, followed in a few minutes by loss of consciousness for several minutes. Upon regaining consciousness, she complained of weakness of the right leg. Examination revealed mental confusion, weakness of the right leg and suppression of the reflexes of the right leg. A lumbar puncture done on admission revealed a pressure of 380 mm. of water, with grossly bloody spinal fluid. Routine roentgenograms of the skull were normal. Bilateral arteriographic study (Fig. 3, A and B) revealed a large aneurysm of the left internal carotid. After the arteriographic procedure this patient had mild expressive aphasia. It was decided that she could not tolerate immediate ligation of the internal carotid artery in the neck, and accordingly, several days later, the left internal carotid artery was exposed and gradually occluded with a clamp designed by Dr. Gayle Crutchfield. After three days the artery was completely occluded, without ill effects. Three days later a left frontal craniotomy was done, and two silver clips were applied intracranially to the left internal carotid, dis-

daisy-head appearance is best seen after 48 or 72 hours' incubation in well isolated colonies. The degree of development of these features varies somewhat with different strains. The "intermediate" strains after 24 hours' incubation are small and flat with a darker centre and lighter coloured periphery, at times being not unlike a frog's egg in appearance. Sometimes the edge is irregular and the surface somewhat roughened. Further incubation alters little except the size and the colour, which becomes more uniformly dark. Strains of the *mutis* type are the most variable of all. In size they range from that of the *gravis* type to that of the "intermediate" or even smaller in the first 24 hours. At this time they may be greyish or smoky in colour but some are very pale and difficult to distinguish from diphtheroids. The colony is smooth and domed and the edge entire, many strains showing a dark centre and paler periphery. On further incubation secondary characters develop, such as a central elevation, concentric rings or papular excrescences. Some strains ultimately present a superficial resemblance to certain *gravis* colonies but are usually easy to distinguish because of their moister and softer consistency.

The medium commonly employed for the purpose of typing diphtheria bacilli is that described by Anderson *et al*. Its essential features are that the meat infusion is never heated above 75° C, the enrichment consists of defibrinated rabbit blood and the tellurite blood agar mixture is heated to 75° C for 10 minutes before it is poured into plates. As shown above citrated sheep blood may be substituted for defibrinated rabbit blood. It remained to determine whether the basal medium described by the Leeds workers had any advantage over the agar recommended by Wright (1933, 1934), which is much easier to prepare, and whether the final heating of the completed medium had any effect on its value.

Four sets of plates were prepared. The first contained Wright's agar with 6 per cent of sheep blood and 0.04 per cent potassium tellurite. The agar was melted and cooled to 50° C, the blood and tellurite added and the plates poured. The second set was similar but the medium was heated to 75° C for 10 minutes before pouring. Set three contained the Leeds medium but this was not submitted to the final heating at 75° C and the fourth batch the same medium which had been so heated. All four sets of plates together with a blood agar control were inoculated with a series of dilutions of suspensions of several strains of different types of diphtheria bacilli. The results are summarised for selected dilutions in table IV.

The amount of growth on the unheated media was very similar with both agars. On heated media the growth of most strains was slower in the first 24 hours but later the colony size rapidly increased and soon equalled that on the unheated. The growth of some

headache and coma recurred. A repeated spinal puncture revealed a pressure of 350 mm. of water, with bloody spinal fluid. Bilateral carotid arteriograms (Fig. 7) were taken, and an aneurysm was observed on the left anterior cerebral artery, which filled from the left injection. There was depression of the left anterior cerebral artery, suggesting a mass lesion. A left frontal craniotomy was done, and a large hematoma was observed in the frontal lobe, extending into the anterior horn of the left ventricle. The hematoma was removed by suction; a clip was applied to the neck of the aneurysm, and the aneurysm was removed. The postoperative course was stormy for several days, and the patient had pronounced weakness of both legs for approximately two weeks. When seen two months after discharge from the hospital, he was normal mentally and had no neurologic deficits.

Aneurysms of the posterior fossa are rare, and I have never encountered one except on postmortem examination. The basilar artery is frequently involved, producing multiple involvement of the cranial nerves. Diagnosis can be established by vertebral arteriographic study. Rizzoli and Hayes²² reported the successful removal of a berry aneurysm of the left posterior inferior cerebral artery in the



Fig. 7 (Case 8).—Aneurysm of peripheral part of left anterior cerebral artery and depression of anterior cerebral artery due to hematoma of frontal lobe.



Fig. 8 (Case 9).—Arteriovenous aneurysm and small berry aneurysm in right frontal region. Note depression of anterior cerebral artery by an intracerebral hematoma.

case of a man who had a subarachnoid hemorrhage. The aneurysm was discovered on operation after a ventriculogram had revealed hydrocephalus with a shift of the fourth ventricle to the right.

Arteriovenous Malformations.—Arteriovenous malformations, although they may occur in other areas, usually occur in the region of supply of the middle cerebral artery, though rarely in the posterior fossa. These lesions are most often on the cortex, with subcortical extension. They usually produce jacksonian or generalized seizures. The aneurysm ruptures and produces a subarachnoid hemorrhage in about 20 per cent of the cases. A patient with previous epilepsy in whom sudden subarachnoid bleeding occurs should be suspected of having an arteriovenous malformation. The bleeding may be entirely subarachnoid, or it may be associated with an intracerebral clot. Treatment consists of symptomatic therapy with anticonvulsive medication or operative intervention. Operative measures vary from cervical ligation to direct attack on the aneurysm. The smaller lesion may be excise . excision of

interfered somewhat with the development of the colonies in the first 24 hours. Similar injury was done by storage of the medium or by prolonged incubation. No difference was observed according to whether tellurite was or was not present at the time of heating. Accordingly strain M 819 was inoculated on to agar, blood agar and blood agar heated for 10 minutes at 75° C. On the blood agar a loopful of a certain dilution of suspension yielded 250 colonies in 24 hours, on agar, 100 times this inoculum yielded 30 colonies while on heated blood agar 1000 times the inoculum yielded only one colony in the same time. The effect with this strain appears to be not only a lack of enrichment but an actual inhibition. From experiments with six other strains of *mitis* type it appears to be due to heating the cells. All these strains gave a confluent growth from a loopful of undiluted suspension on blood agar and agar containing an equivalent amount of heated serum, on agar alone the growth was extensive but thin and the colonies small. On agar containing blood or blood cells and heated to 75° C for 10 minutes, no strain yielded more than 50 colonies and one did not grow at all. The addition of 6 per cent serum to the heated blood cell agar improved growth only slightly. On the same heated media a strain of *H. influenzae* and a recently isolated meningococcus grew luxuriantly from similar inocula. More prolonged incubation in some cases gave rise to more colonies and an enlargement of their size but the number did not approach that on the unheated media. Seventeen strains of the *mitis* type were similarly tested on heated and unheated blood agar, 9 of them (6 virulent and 3 avirulent) grew equally well on both, 8 (6 virulent and 2 avirulent) grew badly on the heated medium. It may be mentioned that this effect of heating was observed with media made from citrated, defibrinated and oxalated horse and sheep blood. It appears that the final heating does not improve the growth of any strains of diphtheria bacilli tested and that it may render the medium quite unsuitable for some strains especially of the *mitis* type.

Discussion

The use of media containing tellurites, though only recently popularised, has proved of the greatest assistance in the study of the diphtheria bacilli, especially since the discovery by McLeod and his colleagues of the various types, which has thrown so much light on the epidemiology of the disease. It seems clear from the experiments reported above that the preparation of a suitable medium for isolation and study of these organisms is a very simple affair that can be adopted by almost any laboratory. The inhibitory effect of tellurites is shown again to be selective but only relatively so. It is influenced by the medium used and

casos las lesiones mayores son imposibles de extirpar sin causar una alza en las mortalidad y morbilidad.

SUMARIO

Os aneurismas da carótida interna, abaixo da apófise clinóide, rotos ou não, podem ser tratados corretamente pela ligadura cervical isolada ou em combinação com a hemostasia intra-craniana. Os aneurismas supra-clinoidianos são melhor tratados pelo grampeamento.

Os aneurismas do triângulo de Willis, quando há rutura, elevam a mortalidade a 50% ou mais. A incidência de recidiva pode atingir 50% e em, aproximadamente, 70-80% os doentes morrem no segundo ataque. A taxa de mortalidade por intervenção cirúrgica sobre os aneurismas não é maior que 20%, cifra que é indiscutivelmente mais baixa que a da mortalidade entre os pacientes não tratados.

Os aneurismas das porções periféricas dos grandes vasos cerebrais não são habitualmente diagnosticados antes da rutura, período em que provocam hemorragia sub-aracnóide e frequentes coágulos intra-cerebrais. O melhor tratamento é acesso cirúrgico direto ao aneurisma, com evacuação do coágulo e e grampeamento no colo do aneurisma. A ligadura cervical parece não exercer benefício significativo.

As malformações arterio-venosas são, em muitos casos, tratadas conservadoramente, sobretudo quando os sintomas são apenas crises convulsivas.

As lesões menores podem ser ressecadas com êxito cirúrgicamente, mas, em muitos casos as lesões maiores são impossíveis de remover sem causar maiores mortalidade e morbilidade.

REFERENCES

1. Moniz, E.: L'encephalographie arterielle, son importance dans la localisation des tumeurs cere-

brales, *Rev. Neurol.* 2:72-90, 1927.

2. Jefferson, G.: (a) Compression of the Chiasm, Optic Nerves and Optic Tracts by Intracranial Aneurysms, *Brain* 60:444-497, 1937. (b) On the Saccular Aneurysms of the Internal Carotid Artery in the Cavernous Sinus, *Brit. J. Surg.* 26: 267-302, 1938.

3. Dandy, W. E.: Intracranial Arterial Aneurysms. Ithaca, N. Y.: Comstock, 1944.

4. Dunn, J. Jr.; Uihlein, A., and Holman, C. B.: The Use of Sodium Diacetozate in Cerebral Angiography, *J. Neurosurg.* 13:627-633, 1956.

5. Abbott, K. H.; Gay, J. R., and Goodall, R. J.: Clinical Complications of Cerebral Angiography, *J. Neurosurg.* 9:258-274, 1952.

6. Sugar, O.: Pathologic Anatomy and Angiography of Intracranial Vascular Anomalies, *J. Neurosurg.* 8:3-22, 1951.

7. Padgett, D. H.: The Development of the Cranial Arteries in the Human Embryo, *Contr. Embryol. Carnegie Inst.* 212:32:205-261, 1958.

8. Dandy, W. E.: Results Following Ligation of Internal Carotid Artery, *Arch. Surg.* 45:521-533, 1942.

9. Voris, H. C.: Complications of Ligation of the Internal Carotid Artery, *J. Neurosurg.* 8:119-131, 1951.

10. Poppen, J. L.: Specific Treatment of Intracranial Aneurysms, *J. Neurosurg.* 8:75-102, 1951.

11. Steelman, H. F.; Hayes, G. J., and Rizzoli, H. V.: Surgical Treatment of Saccular Intracranial Aneurysms, *J. Neurosurg.* 10:564-576, 1953.

12. Bassett, R. C.; List, C. F., and Lemmen, L. J.: Surgical Treatment of Intracranial Aneurysms, *Surg., Gynec. & Obst.* 95:701-708, 1952.

13. Black, S. P. W., and German, W. J.: The Treatment of Internal Carotid Artery Aneurysms by Proximal Arterial Ligation: A Follow-Up Study, *J. Neurosurg.* 10:590-601, 1953.

14. Hamby, W. E.: The Surgical Treatment of Intracranial Aneurysms, *Arch. Neurol. & Psychiat.* 75:345-349, 1956.

15. Walker, A. E.: Clinical Localization of Intracranial Aneurysms and Vascular Anomalies, *Neurology* 6:779-90, 1956.

16. McDonald, C. A., and Korb, M.: Intracranial Aneurysms, *Arch. Neurol. & Psychiat.* 42:298, 1939.

17. Hyland, H. N.: Prognosis in Spontaneous Subarachnoid Hemorrhage, *Arch. Neurol. & Psychiat.* 63:61-75, 1950.

18. Hamby, W. B.: Intracranial Aneurysms. Springfield, Ill.: Chas. C Thomas, Publisher, 1952, chap. 21, p. 564.

19. Norlén, G., and Olivecrona, H.: The Treatment of Aneurysms of the Circle of Willis, *J. Neurosurg.* 10:404-415, 1953.

20. Norlén, G.: The Pathology, Diagnosis and Treatment of Intracranial Saccular Aneurysms, *Proc. Roy. Soc. Med.* 45:291-298, 1952.

21. Norlén, G., and Barnum, A. S.: Surgical Treatment of Aneurysms of the Anterior Communicating Artery, *J. Neurosurg.* 10:634-650, 1953.

22. Rizzoli, H. V., and Hayes, G. J.: Congenital Berry Aneurysm of the Posterior Fossa, *J. Neurosurg.* 10:550, 1953.

interfered somewhat with the development of the colonies in the first 24 hours. Similar injury was done by storage of the medium or by prolonged incubation. No difference was observed according to whether tellurite was or was not present at the time of heating. Accordingly strain M 819 was inoculated on to agar, blood agar and blood agar heated for 10 minutes at 75° C. On the blood agar a loopful of a certain dilution of suspension yielded 250 colonies in 24 hours, on agar, 100 times this inoculum yielded 30 colonies while on heated blood agar 1000 times the inoculum yielded only one colony in the same time. The effect with this strain appears to be not only a lack of enrichment but an actual inhibition. From experiments with six other strains of *mitis* type it appears to be due to heating the cells. All these strains gave a confluent growth from a loopful of undiluted suspension on blood agar and agar containing an equivalent amount of heated serum, on agar alone the growth was extensive but thin and the colonies small. On agar containing blood or blood cells and heated to 75° C for 10 minutes, no strain yielded more than 50 colonies and one did not grow at all. The addition of 6 per cent serum to the heated blood cell agar improved growth only slightly. On the same heated media a strain of *H. influenzae* and a recently isolated meningococcus grew luxuriantly from similar inocula. More prolonged incubation in some cases gave rise to more colonies and an enlargement of their size but the number did not approach that on the unheated media. Seventeen strains of the *mitis* type were similarly tested on heated and unheated blood agar, 9 of them (6 virulent and 3 avirulent) grew equally well on both, 8 (6 virulent and 2 avirulent) grew badly on the heated medium. It may be mentioned that this effect of heating was observed with media made from citrated, defibrinated and oxalated horse and sheep blood. It appears that the final heating does not improve the growth of any strains of diphtheria bacilli tested and that it may render the medium quite unsuitable for some strains especially of the *mitis* type.

Discussion

The use of media containing tellurites, though only recently popularised, has proved of the greatest assistance in the study of the diphtheria bacilli, especially since the discovery by McLeod and his colleagues of the various types, which has thrown so much light on the epidemiology of the disease. It seems clear from the experiments reported above that the preparation of a suitable medium for isolation and study of these organisms is a very simple affair that can be adopted by almost any laboratory. The inhibitory effect of tellurites is shown again to be selective but only relatively so. It is influenced by the medium used and

casos las lesiones mayores son imposibles de extirpar sin causar una alza en las mortalidad y morbilidad.

SUMARIO

Os aneurismas da carótida interna, abaixo da apófise clivóide, rotos ou não, podem ser tratados corretamente pela ligadura cervical isolada ou em combinação com a hemostasia intra-craniana. Os aneurismas supra-clinoidianos são melhor tratados pelo grampeamento.

Os aneurismas do triângulo de Willis, quando há rutura, elevam a mortalidade a 50% ou mais. A incidência de recidiva pode atingir 50% e em, aproximadamente, 70-80% os doentes morrem no segundo ataque. A taxa de mortalidade por intervenção cirúrgica sobre os aneurismas não é maior que 20%, cifra que é indiscutivelmente mais baixa que a da mortalidade entre os pacientes não tratados.

Os aneurismas das porções periféricas dos grandes vasos cerebrais não são habitualmente diagnosticados antes da rutura, período em que provocam hemorragia sub-aracnóide e frequentes coágulos intracerebrais. O melhor tratamento é acesso cirúrgico direto ao aneurisma, com evacuação do coágulo e e grampeamento no colo do aneurisma. A ligadura cervical parece não exercer benefício significativo.

As malformações arterio-venosas são, em muitos casos, tratadas conservadoramente, sobretudo quando os sintomas são apenas crises convulsivas.

As lesões menores podem ser ressecadas com êxito cirúrgicamente, mas, em muitos casos as lesões maiores são impossíveis de remover sem causar maiores mortalidade e morbilidade.

REFERENCES

1. Moniz, E.: L'encephalographie arterielle, son importance dans la localisation des tumeurs cerebrales, *Rev. Neurol.* 2:72-90, 1927.
2. Jefferson, G.: (a) Compression of the Chiasm, Optic Nerves and Optic Tracts by Intracranial Aneurysms, *Brain* 60:444-497, 1937. (b) On the Saccular Aneurysms of the Internal Carotid Artery in the Cavernous Sinus, *Brit. J. Surg.* 26:267-302, 1938.
3. Dandy, W. E.: Intracranial Arterial Aneurysms. Ithaca, N. Y.: Comstock, 1944.
4. Dunn, J. Jr.; Uihlein, A., and Holman, C. B.: The Use of Sodium Diacetozate in Cerebral Angiography, *J. Neurosurg.* 13:627-633, 1956.
5. Abbott, K. H.; Gay, J. R., and Goodall, R. J.: Clinical Complications of Cerebral Angiography, *J. Neurosurg.* 9:258-274, 1952.
6. Sugar, O.: Pathologic Anatomy and Angiography of Intracranial Vascular Anomalies, *J. Neurosurg.* 8:3-22, 1951.
7. Padgett, D. H.: The Development of the Cranial Arteries in the Human Embryo, *Contr. Embryol. Carnegie Inst.* 212:322-205-261, 1958.
8. Dandy, W. E.: Results Following Ligation of Internal Carotid Artery, *Arch. Surg.* 45:521-533, 1942.
9. Voris, H. C.: Complications of Ligation of the Internal Carotid Artery, *J. Neurosurg.* 8:119-131, 1951.
10. Poppen, J. L.: Specific Treatment of Intracranial Aneurysms, *J. Neurosurg.* 8:75-102, 1951.
11. Steelman, H. F.; Hayes, G. J., and Rizzoli, H. V.: Surgical Treatment of Saccular Intracranial Aneurysms, *J. Neurosurg.* 10:564-576, 1953.
12. Bassett, R. C.; List, C. F., and Lemmen, L. J.: Surgical Treatment of Intracranial Aneurysms, *Surg., Gynec. & Obst.* 95:701-708, 1952.
13. Bisco, S. P. W., and German, W. J.: The Treatment of Internal Carotid Artery Aneurysms by Proximal Arterial Ligation: A Follow-Up Study, *J. Neurosurg.* 10:590-601, 1953.
14. Hamby, W. E.: The Surgical Treatment of Intracranial Aneurysms, *Arch. Neurol. & Psychiat.* 75:345-349, 1956.
15. Walker, A. E.: Clinical Localization of Intracranial Aneurysms and Vascular Anomalies, *Neurology* 6:79-90, 1956.
16. McDonald, C. A., and Korb, M.: Intracranial Aneurysms, *Arch. Neurol. & Psychiat.* 42:298, 1939.
17. Hyland, H. N.: Prognosis in Spontaneous Subarachnoid Hemorrhage, *Arch. Neurol. & Psychiat.* 63:61-75, 1950.
18. Hamby, W. B.: Intracranial Aneurysms. Springfield, Ill.: Chas. C Thomas, Publisher, 1952, chap. 21, p. 564.
19. Norlén, G., and Olivecrona, H.: The Treatment of Aneurysms of the Circle of Willis, *J. Neurosurg.* 10:404-415, 1953.
20. Norlén, G.: The Pathology, Diagnosis and Treatment of Intracranial Saccular Aneurysms, *Proc. Roy. Soc. Med.* 45:291-298, 1952.
21. Norlén, G., and Barnum, A. S.: Surgical Treatment of Aneurysms of the Anterior Communicating Artery, *J. Neurosurg.* 10:634-650, 1953.
22. Rizzoli, H. V., and Hayes, G. J.: Congenital Berry Aneurysm of the Posterior Fossa, *J. Neurosurg.* 10:550, 1953.

REFERENCES

- ABDALLA, N W 1935 M Sc Thesis, *Liverpool Univ*
 ANDERSON, J S, HAPFOLD, F C, 1931 *this Journal*, xxxiv 667
 McLEOD, J W, AND THOMSON, J G
 BEYER, J L 1895 *Arch f Anat u Phys*, Physiol Abt, p 225
 CLAUBERG, K W 1929 *Zbl Bakt*, Abt I Orig, cxiv 539
 " 1931 *Ibid*, Abt I Orig, cxx 324
 CONRADI, H, AND TROCH, P 1912 *Münch med Woch*, lix 1652
 DOUGLAS, S R 1922 *Brit J Exp Path*, iii 263
 DUDLEY, S F, MAY, P M, AND 1934 Med Res Counc Spec Rep
 O'FLYNN, J A Ser no 195, p 21
 GILBERT, R, AND HUMPHREYS, 1926 *J Bact*, xi 141
 E M
 GOSIO, B 1905 *Z Hyg*, li 65
 HOFMEISTER, F 1893 94 *Arch exp Path u Pharmakol*, xxxiii 198
 HORGAN, E S, AND MARSHALL, A 1932 *J Hyg*, xxxii 544
 JOACHIMOGLU, G 1920 *Biochem Z*, cvii 300
 KLETT, A 1900 *Z Hyg*, xxxiii 137
 MEGRAIL, E 1923 *J Inf Dis*, xxxiii 466
 SCHEURLIN 1900 *Z Hyg*, xxxiii 135
 SMITH, J F 1914 15 *this Journal*, xix 122
 WRIGHT, H D 1933 *this Journal*, xxxvii 257
 " 1934 *this Journal*, xxxix 359

dural membrane is permitted to remain and does not stretch or yield with growth, the brain of the infant is maintained in a confined space by this envelope, and the blood supply and fluid dynamics are further embarrassed. This may eventuate in mental retardation and epilepsy.³ From the reports of others⁴ and our own observations, several generalizations can be made: 1. Subdural effusions occur in a high percentage of cases of so-called "cured" meningitis. 2. The diplococcus, the meningococcus and *Haemophilus influenzae* are the organisms most likely to cause subdural effusions, but other forms of meningitis may be responsible, e.g., those due to *E. Typhi* and *M. Tuberculosis*. 3. The effusion is frequently bilateral, though it may begin as a unilateral collection. 4. Finally, drainage of the subdural space is necessary and desirable and usually effects dramatic if only temporary improvement. We have observed subdural effusions in association with conditions other than the postmeningitic state: diseases of the respiratory tract and diarrhea, as well as malnutrition — a phenomenon that deserves wider recognition. As has been stated, this "new" syndrome is probably appearing more frequently nowadays since children treated with antibiotics survive and these complications have an opportunity to develop.

The cause of subdural effusions in meningitis and in nonmeningitic states still is not known. It is suspected, however, that any condition that causes a separation of the dura from the arachnoid may cause tearing of the bridging veins in the subdural space, resulting in a small subdural hematoma. The subsequent liquefaction of this blood, highly charged with protein, may exert osmotic tension upon the circulating spinal fluid beneath the arachnoid, drawing it into the subdural space and further increasing the volume. This chain



Portion of subdural neomembrane surgically removed, showing fibrocytes, new blood vessels and lamination (hematoxylin and eosin). (Reproduced by courtesy of the Armed Forces Institute of Pathology.)

of events may occur after spinal air injection in the infant under 2 years of age, as was pointed out by Smith and Carothers.⁵ It may also occur after an operation for hydrocephalus, as reported by Anderson.⁶

On the basis of the foregoing theory we speculated that excessive withdrawal of spinal fluid for diagnostic purposes in the case of an infant with suspected meningitis might create a similar sagging of the brain and tearing of the bridging veins that could initiate this sequential reaction.

We noted that, in many instances, unnecessarily elaborate laboratory tests required a volume of 10 to 15 cc. of spinal fluid, and that this amount was being regularly withdrawn from infants for diagnostic studies. Dr. Hattie Alexander, an authority on the treatment of bacterial meningitis in children, has stated that in her clinic it is customary to withdraw 10 to 15 cc.⁷ She too reports an incidence of

REFERENCES

- ABDALLA, N W 1935 M Sc Thesis, *Liverpool Univ*
 ANDERSON, J S, HAPFOLD, F C, 1931 *this Journal*, xxxiv 667
 McLEOD, J W, AND THOMSON,
 J G
 BEYER, J L 1895 *Arch f Anat u Phys*, *Physiol*
Abt, p 225
 CLAUBERG, K W 1929 *Zbl Bakt*, *Abt I Orig*, cxiv 539
 " 1931 *Ibid*, *Abt I Orig*, cxx 324
 CONRADI, H, AND TROCH, P 1912 *Münch med Woch*, lix 1652
 DOUGLAS, S R 1922 *Brit J Exp Path*, iii 263
 DUDLEY, S F, MAY, P M, AND 1934 *Med Res Counc Spec Rep*
 O'FLYNN, J A Ser no 195, p 21
 GILBERT, R, AND HUMPHREYS, 1926 *J Bact*, xi 141
 E M
 GOSIO, B 1905 *Z Hyg*, li 65
 HOFMEISTER, F 1893 94 *Arch exp Path u Pharm-*
akol, xxxiii 198
 HORGAN, E S, AND MARSHALL, A 1932 *J Hyg*, xxxii 544
 JOACHINOGLU, G 1920 *Biochem Z*, cvii 300
 KLETT, A 1900 *Z Hyg*, xxxiii 137
 MEGRAIL, E 1923 *J Inf Dis*, xxxiii 466
 SCHEURLIN 1900 *Z Hyg*, xxxiii 135
 SMITH, J F 1914 15 *this Journal*, xix 122
 WRIGHT, H D 1933 *this Journal*, xxxvii 257
 " 1934 *this Journal*, xxxix 359

TABLE 1.—*Myelographic Diagnosis*

<i>Correct Myelographic Diagnosis</i>	<i>Cases</i>	<i>Total Decisions</i>	<i>Male Cases</i>	<i>Patients Decisions</i>	<i>Female Cases</i>	<i>Patients Decisions</i>
Normal myelogram, no lesion	2	2	1	1	1	1
"Positive" myelogram, 3 lesions	1	3	1	3	—	—
"Positive" myelogram, 2 lesions	9	18	5	10	4	8
"Positive" myelogram, 1 lesion	51	51	37	37	14	14
"Positive" myelogram, 1 lesion, plus 1 "false positive"	6	6	6	6	—	—
	69	80				
<i>Wrong Myelographic Diagnosis</i>	<i>Cases</i>	<i>Total Decisions</i>	<i>Male Cases</i>	<i>Patients Decisions</i>	<i>Female Cases</i>	<i>Patients Decisions</i>
Normal myelogram, 2 lesions present at operation	2	2	2	2	—	—
"Positive" myelogram, no lesions present at operation	6	6	3	3	3	3
"Positive" myelogram, 1 lesion, plus 1 "false positive"	6	6	6	6	—	—

gerous.)

9. The roentgenologist tapes lead skin markers to identify the right side and the individual vertebrae. The surgeons don protective gowns. Lights are extinguished. Glasses are raised.

10. The location of skin markers is determined fluoroscopically and corrected if necessary.

11. The oil is located, and the table is tilted (either way) slowly and gently. It is important to keep the 1/10 ounce of oil together in a fat little globule. If the globule becomes elongated to a thin string of radiopaque material, it cannot outline any masses that may be in the area.

12. In a lumbar myelogram, examination includes the caudal sac near the second sacral vertebra and extends cephalad at least two interspaces above the location of the lesion as specified by the physician. It is kinder and wiser for the physician to tell the roentgenologist where he may expect to locate the lesion.

13. Roentgen films are taken in the anteroposterior, left oblique and right oblique views of all suspicious areas.

14. The medium is placed under the spinal needle at conclusion of the myelographic procedure. When the fluoroscopic study is concluded, the room is lighted. Such oil as can easily be obtained is aspirated. If 2 cc. is obtained, it is considered plenty indeed. If only 1 drop is withdrawn it is accepted, and the patient is "needled" no more.

15. The patient is transferred supine to a litter and then to his bed, where he remains head down for at least four hours.

Material.—This series of myelograms was taken by one surgeon, with several roentgenologists. There are 125 cases, in which 76 patients were men and 49 were women. The average age of the men was 39 years; that of the women, 37.6 years. Of the 125 myelograms, there were 101 (82 per cent) that showed filling defects; 24, or 18 per cent, seemed normal. It may be interesting that the men had 65 positives and 13 negatives. Roughly then, a positive myelogram is obtained in 8 out of 10 cases when the cases are selected and a diagnosis made prior to the roentgen procedure.

after the method of Dickens and Šimer (1931, 1932) except with cartilage where, owing to the virtual absence of respiration, the latter (Q_{O_2}) could be measured directly. Measurements in phosphate where there is retention were carried out by the same authors' technique. In serum, however, the acid recommended is liable to clot the proteins and to retard and diminish the giving off of CO_2 . In synovial fluid the precipitation of the mucin formed "sacs" (Kling, 1931) which effectively shut off the acid from the rest of the fluid. Lactic acid 6*N* was found to diminish these troubles.

The Ringer solution used was of the following composition —

NaCl	0.9	per cent	1000	parts
KCl	1.15	,	20	"
CaCl ₂	1.25	"	20	"
MgCl ₂	2.1	"	10	"

except in certain experiments with fluoride where the calcium chloride was omitted.

Owing to the very low level of cartilage metabolism, instead of the usual 100 mg, from 600–1000 mg were habitually used, and occasionally up to 2000 mg. The volume of cartilage, whose density was found by Kirkpatrick's method (Kirkpatrick and Kling, 1926) to be 1.09110, must be added to the fluid volume in the calculation of the vessel constant.

Histology. Sections were cut from paraffin blocks of tissue which had been fixed in formol saline and, if necessary, decalcified in

0.5	per cent	chromic acid	3	parts
70.0	"	alcohol	3	"
10.0	"	HNO ₃	4	"

and washed in alum solution with marble chips. Cell counts were made on hæmatoxylin and eosin stained paraffin sections of 10 μ thickness by means of an eye piece micrometer. The cartilage was cut at right angles to the surface and counts of between 200 and 400 cells made at different depths. Estimations of the cellularity of villi were made by counting the total cells in a complete cross section of known depth and measuring the area. To calculate the value of Q_{O_2} per cell requires, of course, besides Q_{O_2} and cellularity, a knowledge of the specific gravity and the ratio $\frac{\text{wet weight}}{\text{dry weight}}$ of the tissue. Even then it leaves out of account shrinkage during fixing and mounting and is thus a very rough approximation.

Chemical methods. Analyses of blood and synovial fluid were carried out by the methods described by Beaumont and Dodds (1936).

Lactic acid was estimated by a modification of Friedemann's method (Friedemann and Graesser, 1933) and mucin by the method of Cajon and Pemberton (1928), which seemed preferable to methods described by Achard and Piettre (1930, 1932) and Kling (1931). It was necessary, however, to add the acid drop by drop, stirring the whole with a glass rod, round which the mucin clung. Collins (1936) is "unconvinced that a true separation of mucin is possible." It was found that, while the first precipitate does of course contain fractions of other proteins (Ropes, 1935), results were good enough to show roughly a direct relationship with viscosity (determined by simultaneous comparison with water in a Hess' viscometer at 20° C).

The fractionation of the plasma proteins in synovial fluid must be performed after removal of the mucin, and due allowance made for the differing nitrogen content.

llenamiento adicionales. La incidencia de defectos múltiples fué 22 por ciento. En 12 casos hubo mielogramas "falso positivos" y en 2 casos mielogramas "falso negativos," como se comprobó en la operación.

La exactitud de los mielogramas se computó por el número de decisiones hechas con base en los mielogramas y comprobadas o no, durante la operación.

El mielograma estaba correcto en 85 por

ciento de los casos.

El porcentaje de casos en que al radiólogo y el cirujano coincidieron en cuanto a la interpretación de los mielogramas fue 92.

Las indicaciones y contraindicaciones para estudios mielográficos se mencionaron. Se surgieron condiciones específicas y se delineó el procedimiento usado en la serie reportada.

The great physician, Sir William Osler, who made his reputation in the United States and died at Oxford in the Regius Professorship of Medicine, was a famous bibliophile. As an impoverished medical student in Canada he began his collection with a copy of *Religio Medici* by Sir Thomas Browne and that volume was placed in his coffin at his death.

Even more than Bacon but in a very different way, Browne (1605-82) is a figure to conjure with. Profoundly religious, he was dangerously superstitious, at least as far as witches were concerned, and yet he seems to have been more subtly, penetratingly, interested in nature than was Bacon, and did more systematic observation and experiment. He was born in London, studied at Oxford and received his medical training and degree on the continent. Practicing medicine in the little town of Norwich, he kept out of the religious and political storms of the day.

His first book, *Religio Medici*, written for his own private satisfaction was first published without his permission in 1643. His fascinating and weirdly learned treatise on popular errors, *Pseudodoxia Epidemica* was published a few years later, and *Hydriotaphia* or *Urne-Burial*, and *The Garden of Cyrus* in 1658. Inspired by the discovery of some ancient sepulchral urns at Norfolk, Browne set down his wondrous reflections on funeral ceremonies, on immortality and annihilation. The final chapter may well be the most gorgeous prose in the English language.

—Houston

stitches, the last one fixing what is left of the ligaments, round and uterosacral. I recover this zone with vesical peritoneum lifted in the Pestalozza manner to "blind out" the whole Douglas cavity and prevent reversal of the vaginal dome.

As I have stated, the treatment of prolapse following hysterectomy is not simple. It is therefore best to prevent prolapse in the first place. By application of the following principles, this, in my opinion, is possible:

1. Test the real value of the perineum and perform a complementary simple colpoperineorrhaphy during the hysterectomy if a perineal deficiency brings about a prolapse.

2. Prefer total to subtotal hysterectomy when there is hypertrophic lengthening of the cervix, especially if the ovaries are to be preserved.

3. Fix the cervical stump carefully if subtotal hysterectomy is performed, either by reimplanting the round ligaments on the stump or by performing the excellent Desmarests operation, to keep the tubes and the ovaries in their respective places and reimplant them in the surface of the stump section. This operation is possible in the surgical treatment of fibroma or even of an important infectious lesion of the tubes that does not require ablation. It offers not only excellent fixation, which prevents prolapse, but the possibility of maintaining some menstrual function.

4. In performing total hysterectomy it is still possible to fix the pedicles on the borders of the vaginal scar. It is easier to attend to this fixation during hysterectomy than to do it long afterward, when an obvious prolapse has occurred.

In order to prevent an eventual prolapse, it is useful to stitch the colic region to the bladder, which isolates the pelvis and prevents abdominal pressure on the vaginal dome. Always I operate in this way in case a vaginal drain is used.

SUMMARY

Vaginal prolapse after hysterectomy is provoked by perineal deficiency but not by perineal deficiency alone. When vaginal prolapse is clinically apparent, ordinary perineal operation is rarely sufficient.

In some cases one has either to treat hypertrophic lengthening of the cervix by complementary operation or to treat lowering of the vaginal dome by high abdominal fixation. Obliteration of the *cul de sac* of Douglas, according to the author, is the best way to solve these difficulties.

RIASSUNTO

Il prolasso vaginale, dopo isterectomia, è provocato da una deficienza perineale, ma non solo da essa. Quando il prolasso vaginale è clinicamente manifesto, ben raramente è sufficiente la sola operazione perineale. In alcuni casi o si deve correggere l'allungamento ipertrofico con una operazione o l'abbassamento della cupola vaginale con una fissazione addominale alta.

Secondo l'autore il miglior modo per ovviare a queste difficoltà è quello di obliterare il cavo del Douglas.

ZUSAMMENFASSUNG

Ein nach Gebärmutterresektion auftretender Scheidenvorfall wird durch Schwäche des Dammes aber nicht durch diese allein hervorgerufen. Wenn ein Scheidenvorfall klinisch in Erscheinung tritt, reicht eine gewöhnliche Dammoperation selten zu seiner Behebung aus.

In manchen Fällen muss man entweder die hypertrophische Verlängerung durch einen weiteren Eingriff oder das Sinken des Scheidengewölbes durch hohe abdominale Fixierung behandeln.

Den besten Weg, diese Schwierigkeiten zu beseitigen, sieht der Verfasser in einer Verödung des Douglasschen Raumes.

end The outline of the villus was not straight but crenated from hyperplasia, and this was associated with an increased total protein and high mucin content of the fluid, as in the sound joint

It appears, therefore, that the villi are of such a thickness that, provided the synovial fluid is kept in equilibrium with the blood, no blood supply is necessary for their nourishment In confirmation, if we take Krogh's (1918-19) figure for the diffusion constant of oxygen in muscle ($k = 1.4 \times 10^{-5}$) as applying to synovial membrane, we find, using Hill's (1928-29) formula $r^0 = \sqrt{\frac{4y^0K}{a}}$ for a cylinder of tissue supplied with oxygen from the outside and using it up at a rate (a), that the maximum diameter (r^0) which can be supplied solely from the outside at a pressure of oxygen in the synovial fluid equal to that of venous blood (y^0), varies from 0.88 to 2.0 mm, for values of Q_{O_2} from -1.0 down to -0.2 (usually about -0.8) Under normal conditions the villi maintain the equilibrium of the synovial fluid Cajori, Crouter and Pemberton (1926) have shown the rapidity with which equilibrium as regards sugar is established (in subjects presumably with arthritis) Their function is then similar to the choroid plexus, although the metabolism of the latter is much greater—according to Krebs about $Q_{O_2} = -20$ and $Q_{O_2}^N = 10$

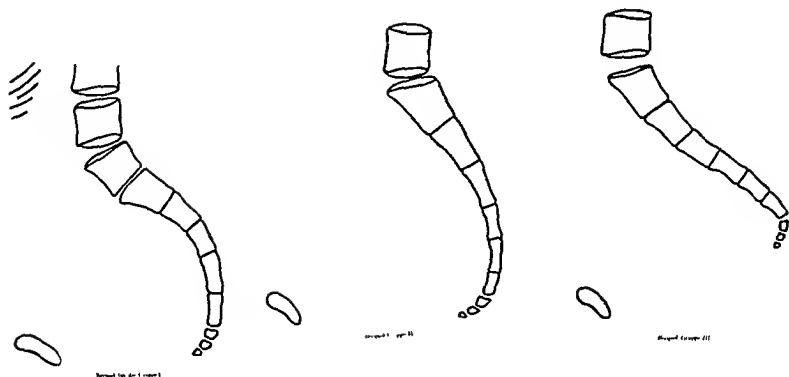
TABLE I
Synovial membrane of the horse

Date	Q_G^N	PO_2 Q_{O_2}	Q_{CO_2}	ble. Q_{O_2}	Q_G^O	R Q
8.7.35	2.27 2.56 2.30		0.56	0.79	1.74	0.71
16.7.35	1.52		0.42 0.32 0.44 1.16 0.88 0.65 0.60	0.59 0.55 0.61 1.34 1.17 0.92 0.84	2.11 1.92 1.86 2.61 2.58 1.86 1.48	0.71 0.69 (s) 0.72 (b) 0.87 0.75 0.72 0.72
10.7.35		0.78 0.87 0.75 0.86 0.72				

(s) Measured in serum by Dickens and Šimer's method

(b) Villi from prepatellar bursa

Table I shows typical figures for the gaseous exchanges of synovial membrane No comparable metabolism has been in-



Left, example of "long pelvis," Type 1. Fifth lumbar vertebra has expressively sacral tendency. Double promontory easily recognizable. Plane of superior straight is steep. Smallest diameter below promontory 1. External measurements within normal limits. Center, example of "long pelvis," Type 2. High promontory, steep pelvic inlet. Only one promontory, sacrum elongated and flattened, sacral concavity still existing. Right, example of "long pelvis," Type 3. Promontory is nearly straight above symphysis. Sacrum totally straightened, forming a "one-way street" without curves. Smallest diameter far below promontory. Disproportion in spite of long conjugata vera.

It is interesting that, at the same time, American authors (Caldwell and Moley), studying the pelvis, also came to conclusions which to a great extent are in accordance with those aforesaid. They distinguish four different types of pelvis. Their "anthropoid" type corresponds with the special pelvic type described by myself. They also stressed the length of the pelvis and the fact that the pelvic inlet appears, anteroposteriorly, more or less like an oval. They also pointed out the high frequency of complications *sub partu*.

I myself distinguish three different types of long pelvis, which differ in their obstetric importance.

Type 1 (see illustration, A).—Assimilation-transitional pelvis: Only the lumbosacral transitional vertebra with sacral character has functional importance: high promontory, double promontory, false conjugata vera I. The birth canal is elongated, the plane of the superior straight diameter is steep.

Type 2 (see illustration, B).—Assimilation pelvis with unchanged shape of sacrum (6 sacral vertebrae); assimilation vertebra belongs anatomically and functionally to the normally shaped sacrum. Only one promontory forms the narrowest diameter. There is certain flattening out of the sacral concavity. The pelvis is elongated with a steep pelvic inlet and a high promontory.

Type 3 A (see illustration, C).—Assimilation-canal pelvis with 6 sacral vertebrae; the most outstanding type of long pelvis. Additional elongation due to stretching of the sacrum, missing sacral concavity. Promontory remarkably high; very steep pelvic inlet. Length of conjugata vera I above average, "true" obstetric conjugata vera (conjugata vera II) situated between the first and second sacral vertebrae, often shortened.

Type 3 B.—Canal pelvis with 5 sacral vertebrae and with a probable but not proved assimilation: Canal hape o vis

Normal synovial membrane thus behaves in the usual way with the few agents investigated *

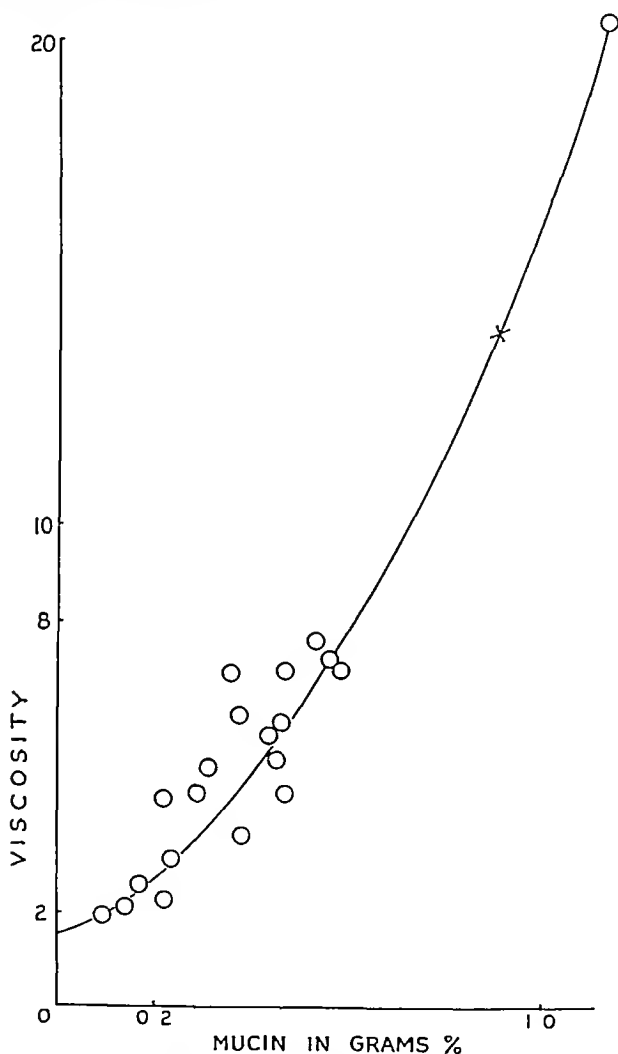


FIG 3 —Viscosity and mucin

(b) Cartilage

In various experiments it was found that thin slices of cartilage gave higher values than thick slices from the same joint. That this was due to inability of the glucose to diffuse through did not seem to us likely.

The maximum thickness of slice which will give constant results (*d*), i.e. in which there will be no undue accumulation of

* Synovial membrane from inflamed joints shows a glycolysis twice or three times the normal

Hypotony Following an Intraocular Surgical Procedure

EVERETT R. VEIRS, M.D., D.A.B.

TEMPLE, TEXAS

HYPOTONY is a rather consistent occurrence after intraocular surgical operations, especially those performed for cataract or glaucoma. In most instances hypotony is not a cause for alarm, as normal intraocular pressure eventually is reestablished with no permanent visual loss. Complications do result in a small percentage of cases, especially when hypotony is accompanied by prolonged flattening of the anterior chamber. The hypotony resulting from loss of vitreous is not included in this article.

The frequency with which hypotony follows the extraction of cataract has been amply demonstrated by Hilding,¹ who observed it so regularly after the twelfth day that its occurrence is now considered the rule rather than the exception. I agree with Hilding¹ that this sequence of events is frequent, whether there is a flattened anterior chamber or not. The same holds true following operations for intraocular glaucoma. Postoperative checks of intraocular pressure show that hypotony frequently lasts for three or four weeks. In the absence of prolonged flattening of the anterior chamber, the intraocular pressure will return to normal limits without any permanent damage to the eye.

Hilding¹ postulated that the trauma, accompanied by edema or hemorrhage or both, that is incidental to the extraction of a cataract causes a disturbance of the electrical potentials between the stroma and the epithelium. As a result, there is interference with the production of aqueous, and the rate of outflow of aqueous is reduced, owing to general congestion. Bellows and his co-workers² suggested that a pronounced diminution of the flow of aqueous may be an important cause of prolonged flattening of the anterior chamber. They expressed the opinion that, because of the pressure gradient between the posterior and the anterior chamber, a transient lack of the aqueous causes the vitreous to be drawn firmly against the iris, thus obstructing the free passage of aqueous from the posterior into the anterior chamber. As the aqueous is thus prevented from entering the anterior chamber, the pressure gradient increases. This places the hyaloid membrane and the vitreous still more firmly against the iris until complete obstruction occurs. With this pupillary block, the back pressure in the posterior segment interferes with uveal circulation, which in turn results in diminished aqueous formation.

I agree with Hilding¹ and Bellows² that diminished formation of aqueous is a cause of postoperative hypotony. In some instances, perhaps, both theories of postoperative hypotony are at least partially

From the Department of Ophthalmology, Scott and White Clinic, Scott and White Memorial Hospital, Scott, Sherwood, and Brindley Foundation, Temple, Texas.

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1955.

Submitted for publication Jan. 2, 1957.

lactic acid and no lack of substrate, is a function of the rate of formation or consumption of the diffusing substance (a) and the concentration at the surface (C_0). The diffusion constant for that substance is denoted by (D) —

$$\text{thus } d = \sqrt{\frac{8C_0D}{a}}$$

(Warburg)

Unfortunately, the rates of diffusion in cartilage of such substances as lactic acid, glucose, bicarbonate and carbon dioxide are unknown

In the adult, articular cartilage possesses neither blood nor lymph vessels, it must be supplied with nutriment either from its deep or superficial surface or both. In any case, the total thickness of the cartilage must be well within the theoretical limits imposed upon it by these various diffusion constants, of which that of glucose is probably the limiting factor since its molecular weight is twice that of lactic acid, and the thickness of the slices in the Warburg vessels should be immaterial. This assumption appears to be justified experimentally

The same thickness of articular cartilage from adjacent areas cut into thin and thick slices respectively (average values obtained by weight area) gave the following values for glycolysis (Q_g) —

	Vessel 1	Vessel 2 (duplicate)	Average thickness of slices in 1st vessel.
Expt 1	0 162	0 170	0 277 mm
	0 162	0 174	0 306 „
	0 145	0 190	0 434 „
	0 167	0 171	0 610 „
Expt 2	0 145		0 366 „
	0 132		0 865 „

The discrepancy is due to the fact that the superficial layers of cartilage, which in cutting tend to be cut thinner than the deep layers, are much more cellular (table VI)

TABLE VI

Site	$Q_g^{N_2}$	Cells per mg
Superficial	0 284, 0 278	2.04×10^4
Deep	0 138, 0 152	1.04×10^4

This probably affects the values in "arthritic" cartilage, where, because of the greater thickness of the cartilage, the measured

chia forms very quickly and will always result in secondary glaucoma unless the condition is recognized and corrected. A small needle knife opening through the iris is sufficient.

The use of Diamox in flattened anterior chambers, as recommended by Agarwal and his associates¹⁰ has not been effective, but I have not tried this method of treatment in many cases.

In cases of flattened anterior chambers, Armstrong¹¹ has recommended a few drops of plasma over the incision, and the addition of 1 or 2 drops of "Thrombin, Topical" solution (1,000 units per milliliter). The eye is left open for one to two minutes to allow the clot to become firm; the upper lid then is lifted gently over it and left undisturbed for twenty-four hours.

SUMMARY

Hypotony of several days' to several weeks' duration following an intraocular surgical procedure is a consistent occurrence. The hypotony, in most instances, will disappear spontaneously without permanent damage unless there are complicating factors, such as a flattened anterior chamber.

Apparently the sudden loss of intraocular pressure that occurs with the opening of an eyeball causes transudation of fluid, congestion and hemorrhages. This occurs because the intravascular pressure within the eye remains normal as the intraocular pressure drops to zero.

The diminution of aqueous formation is a major cause of postoperative hypotony and is due for the most part to the edema, congestion and hemorrhages that occur within the ciliary body and the iris. A major factor in prolonged flattening of the anterior chamber is probably the result of this diminution of aqueous formation. This applies especially when a demonstrable leak cannot be demonstrated or when

no pupillary block is present.

RÉSUMÉ

Les opérations chirurgicales intra-oculaires sont fréquemment suivies d'un état d'hypotonie de plusieurs jours à plusieurs semaines; celui-ci disparaîtra spontanément dans la plupart des cas sans laisser de lésion permanente, à moins de complications, tel—par exemple l'aplatissement de la chambre antérieure.

La baisse soudaine de la pression intra-oculaire au moment de l'incision du globe oculaire, provoque apparemment une transsudation de liquide, ainsi que de la congestion et des hémorragies, dues au fait que la pression intravasculaire de l'oeil reste normale, alors que la pression intra-oculaire tombe à 0.

La diminution de la formation d'humeur aqueuse est une des principales cause d'hypotonie post-opératoire; elle est, en majeure partie, due à l'oedème, à la congestion et aux hémorragies se produisant à l'intérieur du corps ciliaire et de l'iris. Un des facteurs principaux de l'aplatissement prolongé de la chambre antérieure est probablement la conséquence de la diminution de la formation de liquide.

RIASSUNTO

Dopo gli interventi endococulari l'ipotonia è una eventualità pressochè costante per periodi di durata variabile. In molti casi scompare spontaneamente senza lasciare danni definitivi, a meno che non vi siano altre complicazioni come il collasso della camera anteriore.

La perdita improvvisa della pressione endoculare che si verifica con l'apertura dell'occhio causa trasudamento di liquido, congestione ed emorragie. Questo avviene poichè la pressione intravasale rimane normale mentre quella intraoculare è caduta a zero.

Fig 4 shows that there is a latent period after adding the glucose before the increase in metabolism appears (about 18 min

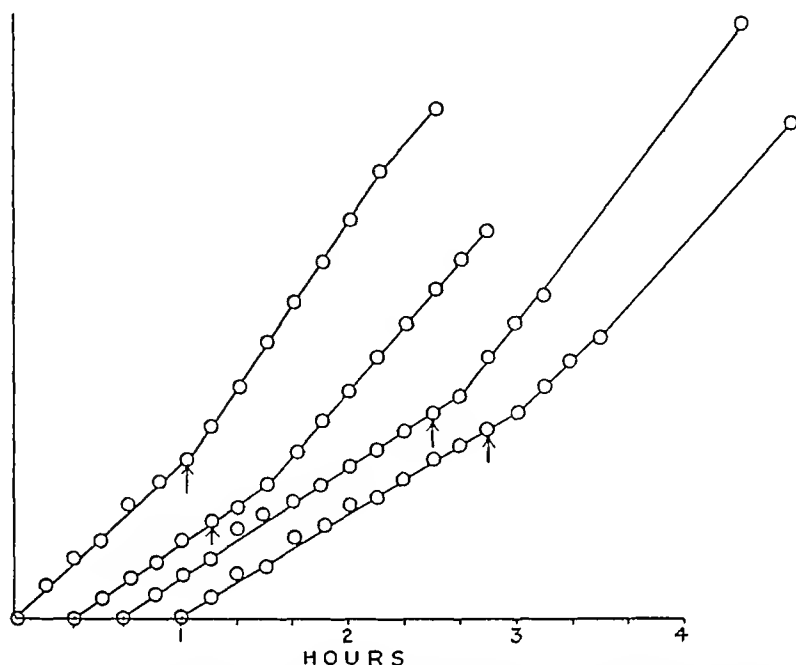


FIG 4.—Horse cartilage glycolysis in N_2 — and CO_2 — saturated, glucose free, bicarbonate Ringer glucose added at arrow

where glycolysis has not fallen much and about 10 min where it has)

TABLE IX

*Showing glycolysis in serum * and synovial fluid * and phosphate †*

Date	Bicarb Ringer	Serum	Synovial fluid.	Bicarb Ringer with phosphate
12 12 35	0 291		0 321	
27 1 35	0 235 0 238 0 248	0 305	0 401	0 291 0 346

* Made up by addition of bicarbonate and glucose solutions to the same strength of these substances as the bicarbonate-Ringer solution

† Made up with phosphate buffer to a 22×10^{-3} molar H_2PO_4 solution (Horse plasma contains 2.4 mg per cent., i.e. 8×10^{-3} molar and synovial fluid from the same horse, 2.8 mg per cent.)

The oxygen consumption of cartilage is so small, if there is any at all, that the figures given in table XII, summarising 19 experiments, must not be regarded as any more than an indication. An average value of -0.005 is found. It was found that a slight falling off occurred during experiments longer than an hour.

index and middle fingers still tingled when struck. The nodule, which had been extremely tender prior to the operation, had "disappeared." Positional changes that caused cramping in the hand, noticed before the operation, had also disappeared. The tips of the thumb, index and middle fingers were still sensitive; there was an occasional "drawing" in the wrist, but the "burning" in the fingers had improved to a pronounced degree. The patient considered himself improved. On physical examination, the significant signs were hypesthesia over the proximal volar portions of the index and ring fingers and hypesthesia distal to this, with normal sensation over the thenar eminence, but hypesthesia over the midvolar surfaces of the phalanges of the thumb. The scar was well healed, nonadherent and just ulnarwards to the thenar crease, extending distally to the midpalm. Some increased weakness in the grip of the left hand was noted, and there was some dryness of the index and middle fingers. No abnormal masses were palpated.

A month after this consultation an ill-defined, pea-sized nodule was observed over the midportion of the scar, and this was judged to be induration about the scar. Pain and tenderness recurred along sensory branches of the median nerve, frequently during the day, and sensory loss in the tips of the thumb, index and middle fingers had become pronounced. A month later the small nodule had become considerably larger and was now present over the distal half of the surgical scar. It was $1\frac{1}{2}$ inches (3.7 cm.) in diameter, not adherent, not moving with finger motions, not pulsating or fluctuating and not extremely tender except on extremely deep pressure. Roentgenograms revealed a large soft tissue mass with a trace of calcification.

On December 28 exploration revealed a moderately firm, brownish-red mass about 3 cm. in diameter, deep to the palmar fascia overlying the adductor of the thumb and the first lumbrical, and apparently incompletely encapsulated. A portion was subcutaneous, distal to the palmar fascia, volar to the first lumbrical tendon and the second metacarpal head. Pathologic examination revealed fibrosarcoma arising in the soft tissues of the hand and revealing many mitoses, anisocytosis, with variations in staining properties, and many areas showing abnormal, rounded nuclei.

On December 30 amputation was performed through the midpart of the left arm. Dissection of the specimen revealed that the neo-

plasm had not extended to within 1.5 cm. of the transverse carpal ligament and that the epitrochlear nodes were not involved. Up to the time of writing no metastasis has occurred.

Clinical Evidence.—About 5,000 years ago a mammary tumor was reported¹ as possibly due to trauma. Controversy has been voluminous since on the possible relation of trauma to new growth. Maude Slye² reported on the frequent occurrence of sarcomas at the sites of wounds in mice (later denied by Curtis³). The increased incidence of sarcoma occurring in "war injuries," in which considerable mechanical damage, infection, suppuration and splinters had exerted an effect over a long period, was conceded by Hellner,⁴ who denied that single trauma could cause osteogenic sarcoma. Gillis and Lee⁵ had described 24 cases of carcinoma arising in sinuses and scars in World War II wounds, whereas Melzner⁶ reported on infrequent sarcoma following World War I wounds, and Hamant⁷ reported likewise. Von Hanseman,⁸ Gruber,⁹ and Pick¹⁰ noted no increase in tumor formation following these wounds. Stout¹¹ reported that in 36 of 66 cases of fibrosarcoma of the extremities the tumor developed in a scar.

Whereas Hellner⁴ denied the possibility that a single trauma could cause giant bone cell tumor or osteogenic sarcoma, Inclan¹² reported in detail 3 cases of giant cell tumors of the knee following falls and knee injuries after several months, and Pack and Braund¹³ described 3 cases of osteogenic sarcoma developing in traumatic hemothorax and hematoma of the thoracic wall.

Earlier reports (e.g., Lowenstein¹⁴) indicated that from 5 to 16 per cent of patients with sarcoma had a history of single trauma, but the evaluation of the history was usually inadequate. To add to the difficulties in evaluating this problem, after Meyerding¹⁵ noted a relation between trauma and the development of fibrosar-

Repeated attempts were made to measure the Q_{O_2} and R Q in bicarbonate Ringer by Dickens and Šimer's method. The method, however, is four times less sensitive than when Brodie's fluid is used in the manometers and is incapable of being modified to deal with large quantities of fluid, so that even the dye-stimulated respiration is incapable of accurate analysis by this method.

Hydrogen acceptors and oxidases No indophenol oxidase could be detected in cartilage by the Nadi reaction. Methylene blue, however, was reduced slowly. Saline extracts prepared by grinding

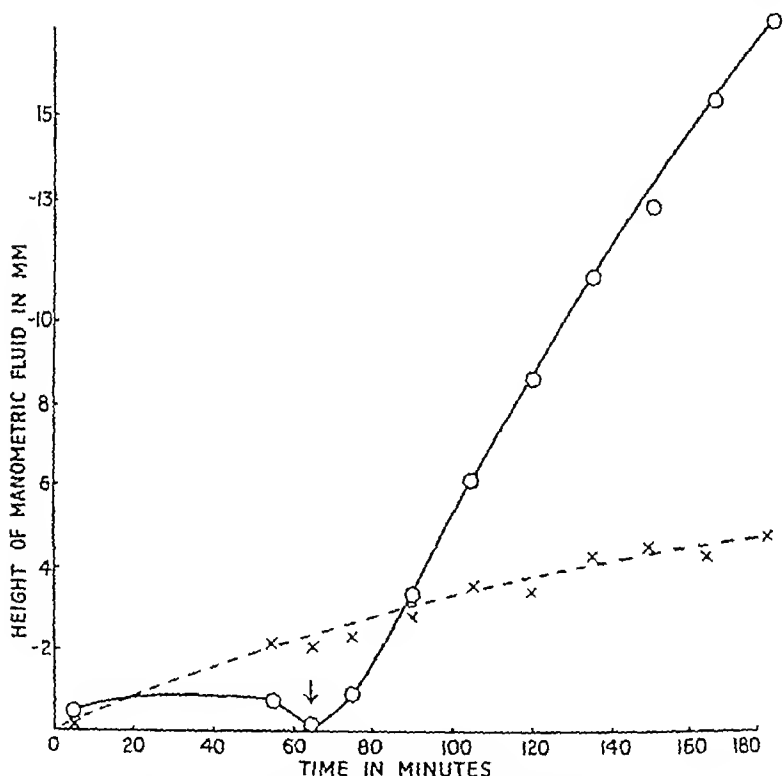


FIG 5—Cartilage 13.1.1936 Q_{O_2} in the presence of thionine. Dye added at arrow. Control shown thus — — — x — — — —

with sand were inactive. Table XII and fig 5 show the effect of methylene blue and thionine on oxygen uptake, which is increased about twenty times. In control experiments with dye but without tissue, no oxygen uptake could be observed. Methylene blue and thionine also increase glycolysis (on the average 11 per cent) but only in the presence of glucose.

Pathology of cartilage About 10-20 per cent of the carpo-metacarpal joints of slaughtered horses show thickening and fibrillation or erosion. The cartilage is almost always in these cases yellow and not the normal pearly blue. Changes in the fluid,

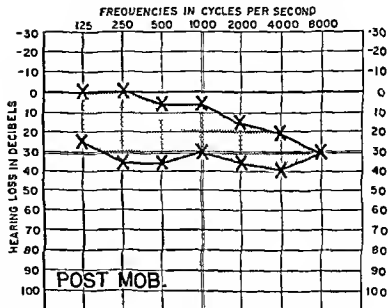
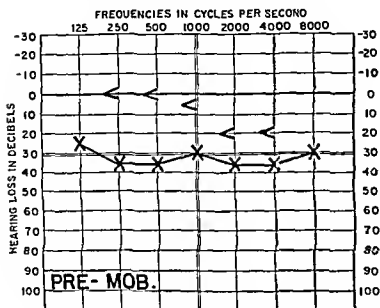
Name K. J. Age 53 Date 10-19-55Name K. J. Age 53 Date 3-20-56

Fig. 3.—A, mobilization of stapes of left ear, Oct. 20, 1955. B, most recent audiogram, showing magnitude of sustained improvement.

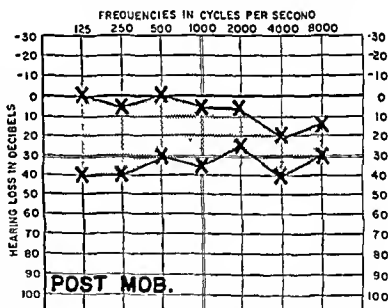
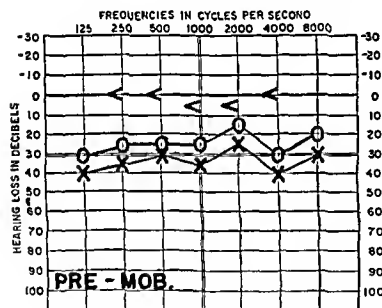
Name R. E. Age 25 Date 5-17-55Name R. E. Age 26 Date 6-25-56

Fig. 4.—A, mobilization of stapes of left ear, April 18, 1955. B, most recent audiogram, showing magnitude of sustained improvement.

except a protective antibiotic, is prescribed.

Anesthesia is obtained by undermining the cutaneous external auditory canal with 0.2 to 0.4 cc. of 4:1 combination of 2 per cent zylcaine and 1:1,000 epinephrine introduced with a 0.5 cc. tuberculin syringe and a 26-gauge short beveled hypodermic needle. One injection is made at the posteroinferior junction of the carti-

laginous and osseous portions of the external auditory canal, in the tympanomastoid suture. Thus the entire posterior and inferoanterior canal wall and the adjacent portions of the tympanic membrane are completely anesthetized.

A peritympanic incision is made in the posterosuperior canal wall, extending from the 11 o'clock position to the 8 o'clock position in the right ear and from the 1

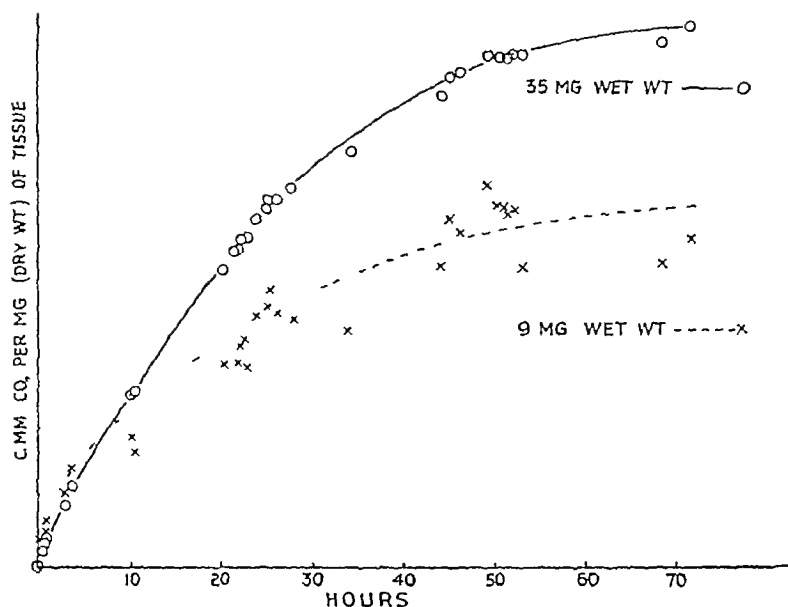


Fig 6—Rabbit cartilage (10 12 1935) in glucose bicarbonate Ringer and CO₂ 5 per cent, N₂ 95 per cent

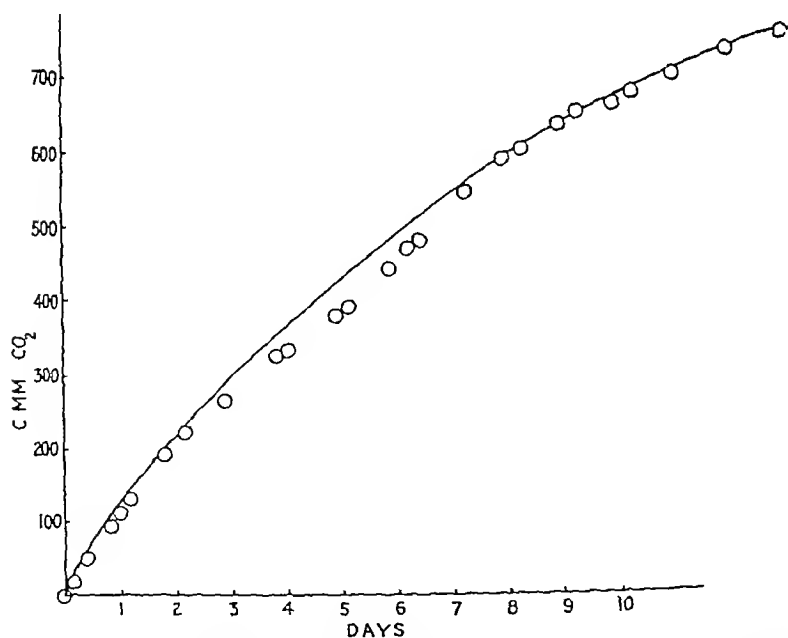


Fig 7—Rabbit meniscus in glucose bicarbonate Ringer 10 12 35 $Q_0^{N_2}$ at start 0 344, at 7 9 days 0 190, at 10 13 days 0 085 Dry weight 21 5 mg Meniscus used whole

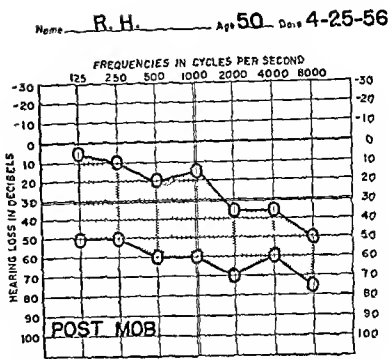
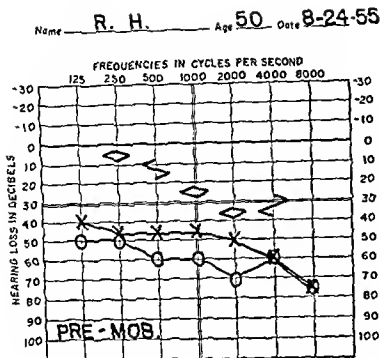


Fig. 9—A, mobilization of stapes of right ear, Aug. 25, 1955. B, most recent audiogram, showing magnitude of sustained improvement.

quence if ordinary technical caution is exercised. In the event of a perforation, a tissue paper diaphragm or a compressed gelatin pledget may be placed over the defect to seal the middle ear during the healing process.

It is possible that otitis media, with its varied complications, may result from mobilization of the stapes unless adequate antibiotic prophylaxis is prescribed. Despite this protective consideration, excessive surgical trauma may invite resistant infection, as it may after any surgical procedure.

On rare occasions the peritympanic incision may be the source of postoperative bleeding, but this is effectively controlled by firmly inserting a cotton pledget in the external auditory meatus to seal off the canal. Meddling with this annoyance is likely to result in contamination and an active infection.⁸

Results.—Four hundred stapes mobilizations were done in the eighteen months between October 1954 and April 1956. The results for the preoperative category one are shown in Table 1. The total number

of ears treated in this group was 210. Hearing improved to the level of 30 db. or more in 94 ears (44.7 per cent). Subsequent regressions, most of them occurring within four weeks after the operation, were noted in 14 ears, leaving a net successful result for 80 ears or 38.1 per cent. Hearing in 68 instances (30 per cent) improved 15 db. or more but did not reach the 30 db. level. Eventual regressions withdrew 16 initial improvements; thus, 47 (22.4 per cent) sustained an improvement of 15 db. or more for six to eighteen months. Hence, total improvement was obtained in 127 (60.5 per cent); total regression in 30 (14.3 per cent), and no improvement in 53 (25.2 per cent).

In preoperative category 2 there were 171 operations (Table 2). Sixty of these, or 35.1 per cent, improved hearing to the 30 db. thresholds or better, but subsequent regressions subtracted 11 within four months after the operation, so that at the time of writing there are 49, or 28.7 per cent, with hearing improvement sustained for six to eighteen months. In 53 (31.0 per cent) appreciable improvement was achieved but did not reach the 30 db. level

That the increase in Q_{O_2} appears to be larger in the absence of glucose, may find an explanation in a hypothesis advanced by Geiger (1935) who, from a study of the effect of glutathione, concluded that the production of lactic acid from glycogen and glucose are two distinct processes, the former proceeding by way of pyruvic acid, and the latter by way of methyl glyoxal

The effect of fluoride on cartilage glycolysis also is significant. While there is no constant difference between the action of fluoride on cartilage glycolysis in oxygen and in nitrogen, the percentage inhibition is constantly less in the absence of substrate, where what glycolysis there is must be due to the splitting of stored glycogen, known to occur in cartilage (Hoffmann, Lehmann and Wertheimer, 1928, Harris, 1932, Robison, 1933, Schluttenhelm and Eisler, 1933, Ikuta, 1935)

(2) *Formation of matrix*

The gross metabolic requirements of cartilage are thus simple the most important transformation of all, however, has not yet been mentioned—that which results in the production of the matrix. Chondroblasts have been grown in tissue culture but without illuminating this aspect of their activities (Fischer and Parker, 1929). One of the conditions under which cartilage is laid down in synovial membrane seems to be avascularity (Jones, 1924). Conversely, the foetal epiphysis before bone forms, where proliferation is relatively more important than secretion, is threaded by many large vessels (Watt, 1928) as in the foetal intervertebral discs and again in arterio-venous aneurysm an excessive blood supply leads to over-proliferation of cartilage. As Bauer and Bennett remark (1936) of the centre cartilage, "reasoning teleologically, one might argue that this restricted source of nourishment is adequate explanation of the fact that articular cartilage is a tissue with a low metabolic rate."

Analogous perhaps is the formation of mucin (Jones, 1930). It is to be noted, remembering that synovial cells in tissue culture produce the most mucin with the minimum of stimulating substances (Vaubel), that in the only example in horses with complete absence of vessels in the villi, there was also a high mucin content of the fluid and the surface cells appeared to be hypertrophied and packed with mucin. Another explanation may, however, be seen in the work of Kuhns (1933), who found that in human atrophic arthritis the normal subendothelial lymphatic network was greatly diminished or absent and that experimentally inflammation obliterated these lymphatics for a length of time depending on its severity and duration, thus decreasing absorption of particulate matter. In many of his human pathological cases,

It does not change the structure of the ear and involves a minimum of mental and physical inconvenience.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Die Ergebnisse von 400 Mobilisierungsoperationen des Steigbügels werden auf Grund der erzielten Verbesserung des Hörvermögens in drei postoperativen Kategorien nachgeprüft. Der Grad des Erfolges hängt offensichtlich vom Umfang der natürlichen Funktion ab, die durch die Schwellenwerte der Knochenleitung für die reine Tongehörmessung und durch eine kochleare Reserve, die einen Unterschied zwischen Luft- und Knochenleitung von mindestens 25 bis 30 Dezibels aufweist, ausgedrückt wird.

Bei 32 Prozent der 400 operierten Patienten war die Verbesserung des Hörvermögens bemerkenswert, bei 22 Prozent von gewissem Nutzen. In 62 Fällen (15,5 Prozent) liess die Hörkraft nach anfänglicher Besserung wieder nach. Viele von diesen wurden nachoperiert und konnten ihre Hörfähigkeit für wachsende Zeiträume erhalten. An einigen Kranken wurde eine Fensterungsoperation ausgeführt, andere zogen es vor, einen Hörapparat zu tragen. Die Erfolge in diesen Fällen bleiben in der vorliegenden Arbeit unberücksichtigt und werden in einer weiteren Untersuchung nachgeprüft werden.

In der Gruppe von 122 Versagern zeigten zehn Kranke einen weiteren Gehörverlust von 10 bis 15 Dezibels; sonst traten keine nachteiligen Erscheinungen auf, die die Fähigkeit des Kranken, den Hörapparat mit wenigstens der gleichen Wirksamkeit wie vor der Operation zu benützen, beeinträchtigt hätten.

Die Mobilisierung des Steigbügels stellt ein verhältnismässig unkompliziertes Verfahren zur Besserung des Hörvermögens bei einer bemerkenswerten Anzahl von Kranken dar, bei denen die Hörschädigung

mit der klinischen Diagnose einer Otosklerose in Einklang steht.

Die Methode führt zu keiner Veränderung des Baues des Ohres und lässt sich mit einem Mindestmass von seelischer und körperlicher Beanspruchung des Kranken ausführen.

RESUMEN Y CONCLUSIONES

Se analizan los resultados de 400 operaciones de movilización del estribo de acuerdo con el grado de mejoramiento en la audición obtenido en tres categorías postoperatorias. Es evidente que el grado de éxito depende de una buena función natural como lo indican los umbrales de conducción ósea para la audiometría de tonos puros y la reserva coclear representada por una diferencia de conducción ósteo aérea por lo menos de 25 a 30 decibels.

Treinta y dos por ciento de los 400 pacientes operados mostraron mejoría marcada y 22 por ciento lograron alguna mejoría en la audición. Además, hubo 62 pacientes (15.5 por ciento) cuyo poder auditivo disminuyó después de una mejoría inicial. Muchos de esos casos han sido reoperados con mejoría satisfactoria y duradera en la audición. Algunos se han sometido a fenestración y otros han preferido usar aparato auditivo auxiliar. Los resultados se han omitido en este reporte y serán objeto de otro estudio.

En el grupo de 122 fracasos, 10 pacientes mostraron una disminución de 10 a 15 decibels; por otra parte, no hubo efectos adversos que impidieran a los pacientes usar un aparato auditivo auxiliar por lo menos tan efectivamente como antes de la operación.

La movilización del estribo proporciona un método relativamente sencillo de mejorar la audición en un número apreciable de pacientes cuyo defecto conducía al diagnóstico clínico de otosclerosis.

arthritis In support of this assumption we may adduce the following calculation According to Hill, the maximum thickness of cartilage to be supplied from one side only is —

$$\left(\frac{d}{2}\right) = \sqrt{\frac{2ky^0}{a}}$$

The only unknown in this expression is the diffusion constant k , and that we have found indirectly by an investigation of loose bodies It has been shown (Bywaters, 1936) that, given a certain glucose consumption (a), a figure for the diffusion constant (k) and a constant surface concentration of glucose (y^0), there is a relationship between the total diameter of the loose body and the diameter of the necrotic inner core so frequently found, of the form —

$$r_o^1 = \sqrt{\frac{6ky^0}{a(2R^3 - 3R^2 + 1)}}$$

where $R = \frac{r^1}{r_o^1} = \frac{\text{radius of core}}{\text{total radius}}$

With a nearly spherical loose body removed by Mr Wiles from the elbow of a boy aged 18 who had fallen on it three months previously, a value for k was found (5.4×10^{-5}) which was just a little more than the rate of diffusion in muscle calculated on a basis of molecular weights from lactic acid (Eggleton, Eggleton and Hill, 1928)* and about one-twelfth of the rate calculated on the same basis in agar jelly

With this value of k , $Q_0 = 0.2$, and $y^0 = 0.08$ per cent as in the body, we get 3 mm as the critical depth, with $Q_0 = 0.1$, 4.2 mm With smaller values of k (such as that calculated from Eggleton, Eggleton and Hill's figures) this depth is reduced to between 0.8 and 3.6 mm for $Q_0 = 0.2$

The normal thickness in man is roughly about 1-2 mm (Sappey) and often much greater in degenerative states It can be seen that while the metabolic requirements of normal cartilage as regards all rapidly used substances are probably easily met from its surface, for less soluble or more complex substances the critical thickness decreases and is probably exceeded by thickened cartilage or with a fall in the surface concentration

Pemberton's work on the rapidity with which such substances as glucose and bicarbonate reach an equilibrium in the synovial fluid shows that as regards these substances there is little to choose between this fluid and blood plasma If we assume on the evidence of these experiments that it is the nearest and therefore usual source

* Since the rate of diffusion is directly proportional to the solubility and inversely to the square root of the molecular weight, we get 0.71 as the factor by which to convert lactic acid to glucose figures

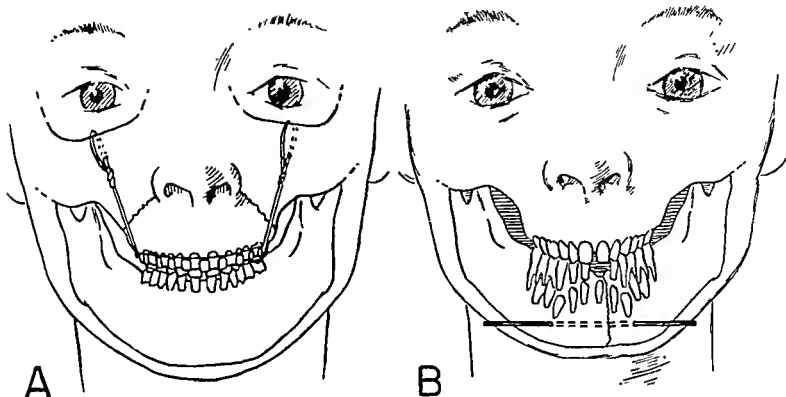


Fig. 1.—A, extra-oral use of orbital rims for stabilization of maxillary fractures. B, extra-oral pin fixation (Kirschner wire technic). This also can be used, care being taken to avoid permanent tooth follicles.

1. Any gross abnormalities in the general contour of the face should be investigated, with a minimum of handling.

2. Light palpation will disclose any sensitive area and any irregularities of the mandible, maxillae, zygomatic arches or zygomas.

3. A careful evaluation should be made of the occlusal status and of any displacement or mobility of the jaws.

4. The presence of submucosal hemorrhagic areas should be kept in mind, since this is usually indicative of underlying damage to the bone, particularly on the lingual aspect.

Roentgenograms.—The taking of roentgenograms, accurately positioned and properly exposed, is the most important of the diagnostic procedures in the young patient.



Fig. 2.—A, preoperative photograph of an 11-year-old girl with a severe left zygomatic fracture. B, preoperative Waters view of facial bones reveals posterior and lateral displacement of left zygoma. Also visualized are multiple fractures of nasal bones. C, postoperative Waters view revealing 32-gauge stainless steel wires immobilizing left zygoma in its normal anatomic relation. Wiring was also necessary for the nasal fractures.

the same order per cell as that of other adult tissues, and is maintained, but at a lower rate, in the absence of glucose. No certain difference between aerobic and anaerobic glycolysis is found, either directly or with fluoride. The inhibition due to fluoride is less in the absence of glucose.

6 The oxygen uptake of cartilage is too small to be accurately assessed. It is immediately increased to a measurable size, probably about twenty times, upon the addition of redox dyes. The presence of dehydrogenase and absence of indophenol oxidase is confirmed.

7 The thickness of articular cartilage is estimated to be such that the deepest layers can, under normal conditions, be supplied with those substances they have been shown to need entirely from the synovial fluid. Under abnormal conditions, such as increased thickness of cartilage or decreased permeability of the synovial membrane, this does not necessarily hold.

8 A human enchondroma showed a metabolism intermediate between that of cartilage and synovial membrane.

This work has been done during the tenure of the MacKenzie MacKinnon Research Fellowship. The author wishes to thank the Committee of the Trust for their kindness to him, various colleagues for their assistance—in particular Mr G D Greville and Mr J Barrett—and, finally, Professor E C Dodds, to whose inspiration this work is originally due and under whose guidance it has proceeded.

REFERENCES

- | | | |
|--|---------|--|
| ACHARD, C, AND PITTRE, M | 1930 | <i>C R Acad Sci</i> , cxc1 1412 |
| " " " | 1932 | <i>Ibid</i> , cxiv 221 |
| BAUER, W, AND BENNETT, G A | 1936 | <i>J Bone and Joint Surg</i> ,
viii 1 |
| BAUER, W, BENNETT, G A,
MARBLE, A, AND CLAFLIN, D | 1930 | <i>J Exp Med</i> , li 835 |
| BAUER, W, SHORT, C L, AND
BENNETT, G A | 1933 | <i>J Exp Med</i> , lvii 419 |
| BEAUMONT, G L, AND DODDS, E C | 1936 | Recent advances in medicine,
8th ed, London, p 384 ff |
| BENNETT, G A, AND BAUER, W | 1931 | <i>Amer J Path</i> , vii 399 |
| " " " | 1933 | <i>Ibid</i> , ix 951 |
| " " " | 1935 | <i>J Bone and Joint Surg</i> , xvii
141 |
| BENNETT, G A, BAUER, W, AND
MADDOCK, S J | 1932 | <i>Amer J Path</i> , viii 499 |
| BEZANÇON, F, AND WEIL, M P | 1934 | <i>Rev du Rhum</i> , i 9 |
| BYWATERS, E G L | 1936 | Unpublished results |
| CAJORI, F A, CROUTER, C Y, AND
PEMBERTON, R | 1926 | <i>Arch Int Med</i> , xxxvii 92 |
| CAJORI, F A, AND PEMBERTON, R | 1928 | <i>J Biol Chem</i> , lxxvi 471 |
| COLLINS, D H | 1936 | this <i>Journal</i> , xli 113 |
| CURTIS, G M, AND BRUNSCHWIG, A | 1929 30 | <i>Proc Soc Exp Biol and
Med</i> , xxvii 358 |

maxilla can be further incorporated for immobilization of a complete fracture of the midportion of the face.

3. It may be difficult to secure anchorage for an arch bar or eyelet loop wiring in a child 7 years of age or younger, and an acrylic splint over the upper teeth may then be utilized to good advantage. The splints are made by taking colloid impressions of the upper and lower teeth and the associated related structures. This may necessitate anesthetizing the child for a short time. After this the acrylic splints can be made from the models poured from the original impressions. When the splint has been properly seated in the mouth, wires of stainless steel are inserted through the soft tissues overlying the maxillae, connecting the splint to a light plaster head cast.

4. Some inconvenience and difficulty may be encountered in maintaining a traction head cast on a child with maxillary

fractures. A procedure that eliminates the use of a head cast has been described by Adams, who suggested the drilling of small holes in the infraorbital rims. Through these, stainless steel wires are threaded and looped around each of the rims, after which they are attached to the maxillae in order to maintain them in their normal anatomic position.³ This works very satisfactorily when only the maxillae are fractured (Fig. 1 A).

Zygomatic Fractures: The majority of zygomatic and zygomatic arch fractures can be easily handled by either of two means. 1. The Gillies approach, utilizing a periosteal elevator which is inserted through an incision in the temporal area. The periosteal elevator follows the path of the temporal muscle under the zygomatic arch, and any malalignment or depressed fracture, if one exists in the zygomatic process of the temporal bone or the



Fig. 6.—A and B, 5-year-old boy with fracture of mandible in region of symphysis and right body. Immobilization was obtained by careful insertion of Kirschner wires as shown in B.

- | | | |
|---------------------------------|------|---|
| POLICARD, A | 1924 | <i>Bull d'histol appl à la physiol</i> ,
1 56 |
| ROPES, M | 1935 | <i>Amer J Physiol</i> , cxiii 112 |
| RYNEARSON, E H | 1931 | <i>J Bone and Joint Surg</i> , xiii
127 |
| SABRAZÈS, J, AND DE GRAILLY, R | 1931 | <i>O R Soc biol</i> , cvi 1155 |
| SAPPEY, P C | 1876 | Traité d'Anatomie descriptive,
3rd ed, Paris, vol 1, p 481 |
| SCHITTENHELM, A, AND EISLER, B | 1933 | <i>Z ges exp Med</i> , lxxxvi 383 |
| SIGURDSON, L A | 1930 | <i>J Bone and Joint Surg</i> , xii
603 |
| SILBERBERG, M | 1936 | 7 <i>Proc Soc Exp Biol and
Med</i> , xxiv 333 |
| SMITH, M, AND CAMPBELL, J R, Jr | 1928 | 29 <i>Ibid</i> , xxvi 395 |
| STRANGEWAYS, T S P | 1920 | <i>Brit Med J</i> , i 661 |
| VAUBEL, E | 1933 | <i>J Exp Med</i> , lvi 63 and 85 |
| WARBURG, O, trans F DIKENS | 1930 | Metabolism of tumours,
London |
| WATT, J C | 1928 | <i>Arch Surg</i> , xvii 1017 |

no further "packing" is used. The patient is allowed to get up when he feels ready, usually on the second to the fourth post-operative day. If continuous bed rest has been ordered this does not apply. The ordinary postoperative measures are used; drawing the finger through the anus every day or two to prevent pocketing or bridging is worth mention.

To epitomize the foregoing comments: Surgical measures are still required in most cases of tuberculous fistula-in-ano. Of first importance is the activity and extent of the pulmonary disease, of which the fistula is merely a complication. The time of operation, except for incision of a perianal abscess, is determined by the activity of the pulmonary disease. In performing a fistulectomy, the standard procedures are used.

CRITERIA FOR DIAGNOSIS

Disagreement exists as to criteria for diagnosis. My experience indicates that the results of histopathologic examination supply the *only* criterion of importance.

It is well known and, in my opinion, a generally accepted fact that a clinical diagnosis founded only on the gross pathologic picture is absolutely undependable, even though the opinion is that of one thoroughly conversant with the lesion. *Not so well known and not so widely accepted* are the real value of histopathologic examination of suspected tissue and the limited reliability of guinea pig inoculation with preparations of tissue excised from the fistulous tract or the wall of the abscess cavity.

The advocates of guinea pig inoculation as the most valuable means of diagnosing tuberculosis in cases of perianal inflammatory and suppurative disease, particularly abscess and fistula, in most instances accept their observations at face value. The fact is there is a large element of error

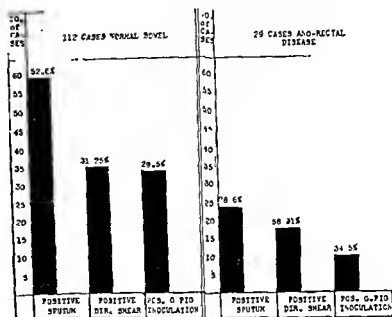


Fig. 2.—Charted observations in 141 of the 200 cases examined.

here that is either unknown or overlooked.

In a study of 200 patients with pulmonary tuberculosis, reported from this service (Fig. 2), it was determined that not only viable but virulent tubercle bacilli were present in the lower portion of the sigmoid and in the rectum in more than 30 per cent. Of patients with anorectal abscess or fistula, 34 per cent had such bacilli present in the last foot of the bowel within an hour after an enema.

In a third of the cases, therefore, tubercle bacilli may enter the rectal or anal orifice (the internal opening) of the fistulous tract. Accordingly, whether the fistula is a tuberculous process or not, tubercle bacilli may be present in it in a third of the cases. At the time the report was published, this large margin of possible error had not been considered in any article on the subject in the current literature. One reason for this is that so little work had been done to determine the incidence of viable tubercle bacilli in the terminal portion of the bowel.

It is absolutely impossible to wash or treat tissue excised or curetted from these fistulous tracts in any way known to bacteriologists, so that contamination of tis-

It is therefore possible to embed fixed tissues in about eight hours and it was found that blocks prepared according to the above procedure cut well after having been kept a year

Small pieces or tissues which are easily penetrated can be embedded in seven hours or even less, but seven hours was found to be insufficient for embedding pieces of kidney 5 mm thick. The time for cellosolve dehydration was reduced in this instance to two and a half hours but dehydration was incomplete. On the other hand a piece of kidney 3.4 mm thick was successfully embedded in less than six hours by the following procedure

saline	10 minutes
cellosolve	2 hours (3 changes)
xylol	1 hour (1 change)
paraffin	2 hours 45 minutes (2 changes)

Kidney tissue stored in cellosolve for three weeks after fixation in formalin was embedded, cut and stained and did not appear to have suffered in any way. This suggests that cellosolve may prove to be a suitable medium for prolonged storage of tissues prior to embedding.

After sections have been cut and transferred to slides the times used for hæmatoxylin and eosin staining were as follows

xylol	2 minutes
cellosolve	1½ "
rinse in water	
Delafield's hæmatoxylin	2 "
rinse in 0.5 per cent HCl in water if necessary	
blue in tap water	15 "
distilled water	1 minute
0.5 per cent eosin dissolved in cellosolve	5 minutes
wipe off excess stain	
olive oil	½ to 1 minute
rinse in xylol	
mount in Canada balsam	

This means the elimination of some changes of solution and a saving of a few minutes in time, but the principal gain is in the avoidance of the use of absolute alcohol.

Frost makes the statement that cellosolve "requires no alterations in the stains usually employed" and Thorp that "cellosolve is quite suitable to be used in all cases where absolute alcohol was used for dehydration". The effect of cellosolve on different stains varies, however. According to Frost and Thorp, magenta, cotton blue, safranin, light green, hæmalum and orange G are unaffected.

Sections of vocal cord, tonsil, pig's liver and submaxillary gland stained with Heidenhain's "Azan" modification of Mallory's stain with the substitution of cellosolve for alcohol were difficult to distinguish from control slides after storage for one year. Cellosolve for 1½ minutes was substituted for each of the following stages: descending alcohols, differentiation with alcohol and aniline oil, ascending alcohols and the final xylol stage, the sections being taken straight from cellosolve into Canada balsam. The control slides showed better nuclear and granular detail. The differentiation stage with aniline oil would therefore appear to be necessary. Similar results were obtained when the sections were left in cellosolve for five minutes during this differentiation stage.

Sections of pig embryo stained with azocarmine only for 1½ hours retained their colour after immersion for 1 hour in cellosolve. Some of the stain was removed when the sections were left in cellosolve overnight (17 hours). Other sections from the same series were stained with aniline blue and orange G and were unaffected by immersion in cellosolve for one hour, but after immersion overnight the aniline blue had become pale in spite of an

nelle sezioni in serie è positivo nel 75%.

E' sufficiente colorare una sezione ogni tre o anche una ogni 10. Se l'animale o le colture sono positive e lo sputo è negativo questi casi devono essere uniti a quelli stabiliti con gli esami istopatologici. In assenza di questi criteri la lesione deve essere considerata come non tubercolare o

almeno lasciata in dubbio fino a che non venga provato il contrario.

REFERENCE

Martin, C. L., and Sweany, H. C.: Streptomycin in the Treatment of Tuberculosis of the Recto-sigmoid Region and Anus, Surg., Gynec. & Obst. 90:681-685 (June) 1950; Tuberculosis Anal Abscess, Fistula, Criteria for Diagnosis, *ibid.* 71: 294-296 (Sept.), 1940.

IMPORTANT NOTICE TO ALL PARTICIPANTS IN CONGRESSES AND REGIONAL MEETINGS

Those desiring their Congress presentations to appear later as articles in the Journal of the International College of Surgeons, please note:

1. A full copy of the manuscript, together with all illustrations, legends, tabular matter and bibliographic references, should be sent DIRECT to the Editorial Office, Journal of the International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois. Manuscripts so submitted will be promptly acknowledged and, on acceptance by the Editorial Board, published as soon after the Congress as possible. The Journal cannot be held responsible for loss, failure of acknowledgment, delay in publication or nonpublication of any manuscript, or any subsidiary material appertaining thereto, which has not been submitted through the official editorial channels.

2. Manuscripts may be submitted in advance of the Congress if desired, date of the Congress or Meeting concerned, to guard against premature publication.

3. Manuscripts delivered in person to Congress officials or others for press reportorial use only should be sent by the recipient to the Public Relations Bureau.

4. If illustrations are desired and it is impossible to submit them at the time the manuscript is submitted, the notation "Illustrations to come" should accompany the latter; otherwise the article may be scheduled for publication before the illustrations have arrived.

These requests are made not only to safeguard the Journal from error but in the best interests of our contributors. To make sure of prompt acknowledgment and efficient handling of your Congress presentation, please send it DIRECT to its ultimate destination!

The boiling point suggests the possibility of recovery of used cellosolve by distillation

Cellosolve is obtainable in at least two grades. The quality used in this department has been supplied by the Eastman Kodak Co., Rochester, N Y., and is specified as P1697 ethylene glycol mono ethyl ether (pract.). The cost is 45 cents for 500 g. plus package, postage and duty. 1697 ethylene glycol mono ethyl ether, B P 133-135° C at a cost of 35 cents per 100 g. did not appear to give any better results. Thorp states that cellosolve is supplied by British Drug Houses at 1s. 2d. per 100 c.c. It is principally used as a solvent for nitrocellulose and resins in the manufacture of lacquers and lacquer thinners and should therefore be obtainable in larger quantities at a cheaper rate than is indicated above.

Apart from the question of cheapness, the use of cellosolve instead of alcohol eliminates certain restrictions which result from Customs regulations and which are particularly irksome in some parts of the world. Also, it does not absorb water in the same way as absolute alcohol and does not require to be kept so carefully stoppered.

Summary

1 Cellosolve may be used in place of alcohol when embedding tissues in paraffin wax and blocks so made cut well. The process described is rapid and may be reduced to six hours by the use of small pieces of tissue. It is also flexible, because tissues may be left in cellosolve for varying periods. Three weeks' immersion produced no adverse effects.

2 Cellosolve may be used in place of alcohol during certain staining processes without detriment to the result, hæmatoxylin, azocarmine, aniline blue, orange G and methylene blue being, for practical purposes, unaffected by the solvent. Eosin used in conjunction with cellosolve gives good results with the technique described on p. 270. Neutral red on the other hand is rapidly decolourised by cellosolve.

3 The principal advantages in the use of cellosolve are a saving of time, particularly in paraffin wax embedding, and the elimination of alcohol to a very considerable extent from both embedding and staining processes.

REFERENCE

WAITE, C. P., PATTY, F. A., AND YANT, *Pub. Health Rep.*, 1930, xlv. 1459
W. P.

578 65 612 345

STAINING METHODS FOR THE ISLETS OF LANGERHANS

J H BAYLEY

University College Hospital Medical School, London

(PLATE XXVI)

In 1889, almost simultaneously, granules were first described in the cells of the islets of Langerhans by Tschassownikow and Laguesse. The former stained fresh pancreas with methyl green and safranin after fixation in 10 per cent formalin or Podwyssotzky's or Hermann's fluid, the latter

SUMMARY AND CONCLUSIONS

Five cases are reported of extensive cicatricial stenosis of the esophagus, treated during the past two years by retrosternal transposition of an isolated colonic loop. In 4 cases the right half of the colon and the terminal portion of the ileum were transplanted; in 1 case, the transverse portion of the colon, together with the splenic flexure. Reestablishment of the continuity of the intestinal tract was effected in 4 cases by an ileotransverse anastomosis and in 1 case by a colocolonic anastomosis of the ascending with the sigmoid portion of the colon. One end of the isolated loop of colon was implanted into the stomach (in 4 cases in conformity with peristalsis and in 1 case contrary to it). The other end was brought up to the left cervical region, where in 4 instances an ileostomy was performed and in 1 a colostomy of the descending portion of the colon. Ileostomy or colostomy was used to feed the patient, a rubber tube being introduced into the stomach during the stages of reconstruction. At a second stage an end-to-side anastomosis of the transected cervical portion of the esophagus with the ileum or the colon was carried out, and at a third stage the ileostomy was closed. All patients were discharged with satisfactory functional results and with notable gains in weight. Retrosternal transposition through the anterior portion of the mediastinum presents many advantages, such as the absence of pleural complications and the fact that it requires a lesser length of mobilized colon than does subcutaneous transposition. Replacement of the esophagus by the right half of the colon is regarded as the method of choice, because of the isoperistaltic transposition. Anomalies of the right colic artery may eventually preclude utilization of the right half of the colon, however, in which case the trans-

verse or the left portion should be transplanted in preference to the small intestine.

RIASSUNTO E CONCLUSIONI

Vengono riferiti 5 casi di estese stenosi cicatriziali dello esofago trattate, negli ultimi due anni, con la trasposizione retrosternale di un'ansa isolata del colon. In 4 casi furono trapiantati la metà destra del colon e la porzione terminale dell'ileo; in 1 caso fu trapiantato, invece, il colon trasverso con la flessura splenica. La continuità del tratto intestinale fu ristabilita in 4 casi con un'anastomosi ileotrasversa e in un caso con un'anastomosi colocolica dell'ascendente con la porzione sigmoidea del colon. Una estremità dell'ansa isolata venne impiantata, in 4 casi, nello stomaco in senso isoperistaltico ed in 1 caso in senso contrario. L'altra estremità fu inserita alla regione cervicale dove, in 4 casi un ileostomia o colostomia servì ad alimentare il paziente, dopo che durante la fase ricostruttiva, gli era stato introdotto un tubo di gomma nello stomaco. In un secondo momento si praticò un'anastomosi terminolaterale della porzione cervicale dell'esofago con l'ileo o il colon; e in un terzo stadio si chiuse l'ileostomia. Tutti i pazienti vennero dimessi con ottimi risultati dal punto di vista funzionale e tutti notevolmente aumentati di peso.

La trasposizione retrosternale attraverso il mediastino anteriore presenta molti vantaggi quali l'assenza di complicazioni pleuriche e un tratto di colon mobilizzato minore di quello richiesto nella trasposizione sottocutanea. La sostituzione dell'esofago con il colon destro è il metodo d'elezione data la trasposizione isoperistaltica. Può verificarsi che un'anomalia dell'arteria colica destra precluda l'utilizzazione del colon destro, ed in tal caso si preferisce l'utilizzazione del colon sinistro o trasverso.

The following combinations of acid and basic dyes are successful after this fixation —

- 1 Fuchsin blue—basic fuchsin and methyl blue
- 2 Fuchsin orange—basic fuchsin and orange G
- 3 Fuchsin violet—azofuchsin and gentian violet

These are prepared by the precipitation method. Saturated solutions in distilled water of each dye are mixed at room temperature until complete precipitation occurs. The precipitate is filtered off, washed until the colour of the basic dye predominates in the washings and dissolved in absolute ethyl alcohol. The solution is filtered before use. It is not essential to dry the precipitate before dissolving in alcohol.

1 *Fuchsin orange and hæmatoxylin*

- I Thin sections in xylol for 2 minutes
- II Absolute alcohol 1 minute
- III Lugol's iodine 2 minutes
- IV Wash well in absolute alcohol
- V Ehrlich's acid hæmatoxylin 20 minutes
- VI Wash in running tap water for 5 minutes
- VII Acid alcohol until pink
- VIII Wash well in running tap water
- IX Mix equal parts of staining solution (fuchsin orange) and distilled water in a suitable vessel, heat but do not allow to boil, flood section with this heated solution for 1 minute. Evaporation with precipitation of dye must be prevented.
- X Blot swill in absolute alcohol
- XI Lugol's iodine until section is a uniform reddish brown colour (about 10 seconds)
- XII Blot absolute alcohol 2.5 minutes
- XIII Xylol Mount in Canada balsam

Results depend almost entirely on differentiation in iodine. Aniline oil xylol may be used after iodine.

Nuclei and connective tissue stain blue, red corpuscles bright red, zymogen granules and "granular cells of the acini" bright red, granule cells in islets (β cells) bright pink, non granular (α) cells pale blue (fig 1)

2 *Fuchsin blue method*

- I Thin sections in xylol for 2 minutes
- II Absolute alcohol 1 minute
- III Lugol's iodine 2 minutes
- IV Wash well in absolute alcohol
- V Stain with fuchsin blue diluted and heated as in stage IX above
- VI Proceed then as for fuchsin orange

Nuclei and connective tissue stain blue, red corpuscles dark blue, zymogen granules dark bluish violet, "granular cells of the acini" red, granule cells in islets (β cells) red, non granular (α) cells pale blue.

3 *Fuchsin violet method*

Stain as for fuchsin blue

Nuclei and connective tissue unstained, red corpuscles dark red, zymogen granules deep violet, "granular cells of the acini" reddish violet, granule cells in islets (β cells) violet, non granular cells unstained.

colon droit est considérée comme la méthode de choix, en raison de la transposition iso-péristaltique. Les anomalies de l'artère colique droite peuvent éventuellement empêcher l'utilisation du colon droit; dans ce cas le transverse ou le colon gauche peuvent être transplantés, de préférence à l'intestin grêle.

RESUMEN Y CONCLUSIONES

Se reportan cinco casos de estenosis cicatricial extensa del esófago tratada por transposición retro-esternal de un asa aislada de colon, durante los últimos dos años. En 4 casos la mitad derecha del colon y la porción terminal del ileon fueron trasplantadas; en un caso el colon transverso con el ángulo esplénico. El restablecimiento de la continuidad del tracto intestinal se efectuó en 4 casos por una anastomosis ileo transversa y en 1 caso por una anastomosis colo-cólica, de la porción ascendente del colon al sigmoide. Un extremo del asa aislada de colon se implantó en el estómago en 4 casos, en forma isoperistáltica, y en un caso en forma anti-peristáltica. El otro extremo se llevó a la región cervical, en 4 casos se alimentó al paciente, a través de una ileostomía ó colostomía, introduciéndose un tubo de hule en el estómago durante los tiempos de la reconstrucción. En un segundo tiempo una anastomosis término-lateral de la porción cervical seccionada del esófago con el ileon ó con el colon se llevó a cabo y en un tercer tiempo se cerró la ileostomía. Todos los pacientes fueron dados de alta con resul-

tados funcionales satisfactorios y con notable aumento de peso.

La transposición retroesternal a través del mediastino anterior presenta muchas ventajas tales como la ausencia de complicaciones pleurales y por el hecho de que requieren menor longitud de colon movilizado que la transposición subcutánea. El reemplazo del esófago por el colon derecho se considera el método de elección para la transposición isoperistáltica. Las anomalías de la arteria cólica derecha pueden eventualmente impedir el uso del colon derecho en cuyo caso el colon transverso, ó el colon izquierdo pueden trasplantarse, siendo estos preferibles que el intestino delgado.

BIBLIOGRAPHY

- Froelich and Dantlo: Mem. Acad. de chir. 77: 185, 1951.
 Godard, H.: Presse med. 59:314, 1951.
 Goligher, J. C. S., and Robin, R.: Brit. J. Surg. 17:1373, 1954.
 Judine, S.: Surg., Gynec. & Obst. 78:561, 1944.
 Kourias, P.: Acta chir. Helliniki 3:93, 1955.
 Lafargue, P., and Dufour, R.: Mem. acad. de chir. 77:362, 1951.
 Lafargue, P.: Mem. acad. de chir. 77:420, 1951.
 Lortat-Jacob, E.: Presse med. 82:1259, 1949; Mem. Acad. de chir. 77:586, 1951.
 Makkas, M.: Acta chir. Helliniki A:5, 1954; Helliniki Iatriki 1:6, 1937.
 Orsoni, P., and Toupet, A.: Presse med. 58:804, 1950.
 Orsoni, P., and Lemaire, A.: J. de chir. 7:491, 1951.
 Reeve, Betts, Thomas, and Copinath: Surgery 38:553, 1955.
 Shumacker, H. B. Jr., and Battersby, J. S.: Ann. Surg. 133:463, 1951.
 Toupet, A.: J. de chir. 66:37, 1950.
 Rapant, V., and Hromada, J.: J. Thoracic Surg. 20:454, 1950.
 Von Hoeker, K.: Arch. f. klin. Chir. 53:973, 1926.
 Wulliet, M.: Semaine med. 31:529, 1911.

The noise of the mill is heard by many; the flour is seen by few.

of his works that did survive contained least of the essence of his searching mind. They were dogmatic rather than scientific and thus appealed to the dogmatic minds of the medieval scholastics. To doubt Galen was tantamount to heresy and to be avoided by all means.

It took a complete change of intellectual atmosphere like that brought about by the Renaissance to cut through the thick veil of adoration that surrounded the traditional authorities.

Of the cultural factors that brought about the Renaissance the most important, perhaps, was the recovery of the original texts of the classics. Medievalism had abundant versions of classical texts, but the authors were obscured rather than clarified by too many translators, commentators and glossaries. Another factor contributing to the rebirth of thought was the expansion of Europe, the widened horizons that were the results of the Columbian voyages and, more specifically for medicine, the importation of new and important drugs. Finally, it was the invention of printing in 1450 that made the cultural achievements of the Renaissance possible. The Renaissance, thought of as a rebirth of the thought of antiquity, was destined to go beyond the Greeks and to lay the foundation of modern thought and method, especially in medicine and the related sciences. New thought, however, could not easily be substituted for old beliefs, and fierce struggles occurred between those who strove for advance and those whose security lay in the *status quo*. The spirit of the Renaissance was expressed by Niccolo Leonicensio, one of the earliest botanists, who said, "Why has nature given us our eyes and other senses unless we may rely upon ourselves in the search of what is true?" This dictum could easily have applied to the Renaissance anatomists and surgeons, for they were among the first to deviate from tra-



Anatomic sketch of two skeletons and two muscular men, after Rosso de Rossi, 1496-1541.

dition and to use their eyes and their senses to discover what was true.

It is significant that the beginning of the study of human anatomy was made by one who was then and is now best known for his superb and unrivaled artistry. Leonardo da Vinci was a true humanist and a Renaissance personality in the most poignant sense of the term. His education combined philosophy with all other cultural subjects and medicine and the study of sciences with art. In his paintings his attention was often directed to the human body, and he felt that he could not do justice to the human body unless he understood it functionally and structurally. It was his plan, therefore, to write a textbook of anatomy; but, while many of his anatomic drawings have been preserved, they were less well known to his contemporaries than to us and of no influence on the anatomic thinking of his day. His textbook of anatomy was never published.

The real father of modern anatomy was Andreas Vesalius, who lived from 1514 to 1564. He was a Belgian from Wesel, from which he derived his name, and studied medicine at Louvain in Belgium and afterward in Paris. In both places he found the instruction utterly conservative and entirely based on Galen's anatomic texts.

REFERENCES

- ARNDT, H J, AND NEUMANN, 1933 *Abderhalden's Handbuch der biologischen Arbeitsmethoden*, Abt VIII T I H 10, Lieferung 409, S 1681 *Berlin*
- BENSLEY, R R 1911-12 *Amer J Anat*, *vi* 207
- BOWIE, D J 1924 25 *Anat Rec*, *xxix* 57
- CAMERON, G R 1924 *Med J Australia*, *i* 532
- HINTEREGGER, F 1931 *Beitr path Anat*, *lxvii* 555
- HOMANS, J 1912 13 *Proc Roy Soc*, B, *lxvvi* 73
- LAGUESSE, E 1889 *Compt rend Soc biol*, 9 ser, *i* 341, quoted by Laguesse, E, *J l'Anat et Physiol*, 1895, *xxxi* 475
- " 1905 *Le pancréas*, *Lyon and Paris*
- LANE, M A 1907 08 *Amer J Anat*, *vii* 409
- MARTIN, W B 1922 *J Metabol Res*, *i* 43
- TSCHASSOWNIKOW, S 1889 *Travaux de la Soc de la natural de Varsovie*
- " 1906 *Arch mikr Anat*, *lxvii* 758
- UKAI, S 1926 27 *Mitt allg Path u path Anat*, *iii* 1

576 851 3 (V cholerae) 576 809 6

LYSOGENIC STRAINS OF V CHOLERAÆ AND THE INFLUENCE OF LYSOZYME ON CHOLERA PHAGE ACTIVITY

P BRUCE WHITE

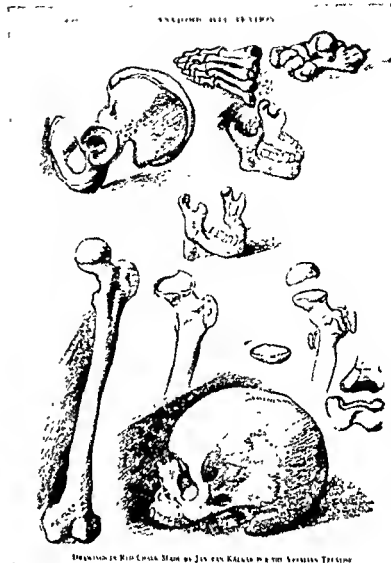
*National Institute for Medical Research, Hampstead,
London, N W 3*

Cholera phage L is among the more recently isolated cholera phages. Statements in the Report of the Twelfth Conference of Medical Research Workers, Calcutta, 1934, and in the corresponding report for 1935 form the only published information of which I am aware. It is there stated that cholera phage L was isolated at Shillong from Calcutta sewage, is probably rare, is of low lytic power and lyses the Shillong vibrio 653. A strain, now lost, of ϕ L, received from Shillong through Colonel J Morrison, attacked the vibrio 653. More recently I have received from Dr de Mente of the Calcutta School of Tropical Medicine another sample under the label cholera phage L with instructions to propagate it on the Japanese cholera vibrio "Inaba". Neither the filtrate received nor the cholera phage cultivated from it have caused discernible lysis of Shillong 653. I have therefore grave doubts as to whether the cholera phage in question represents the original L type of the Shillong laboratory—it certainly corresponds to no other named cholera phage, but may be a new type. To avoid confusion I refer to it in the sequel as cholera phage LL, the matter of nomenclature does not affect the issues discussed.

Visible activity on the part of the LL ϕ has been found limited to certain strains of *V cholerae* and has as a rule been feeble. Attempts to passage it in peptone water cultures have usually led to progressive enfeeblement of successive filtrates, but it has been found that egg white lysozyme (egg white

The experiences of Paracelsus, the Critic, and of Vesalius, the Observer, helped to instil caution into the third great figure of Renaissance surgery, Ambroise Paré. Paré, the Experimenter, was born in 1510 and died in 1590. He was entirely different from the two other medicosurgical heroes of the Renaissance. Vesalius and Paracelsus were well educated: Vesalius had laboriously demonstrated that Galen's facts were false. Paracelsus had rebelled against tradition and attacked Galen with violence. Paré was not educated. His incentive was not rebellion, it was not even the conscious desire for scientific observation, it was compassion for those who suffered. He was born in 1510 and had been apprenticed as a boy to a barber. During his apprenticeship he clipped the hair of his clients, he shaved and bled them, he pulled their teeth and dressed their wounds, and with all these ministrations he felt more and more attracted to surgery. In order to learn more about surgery, he went to the Hôtel Dieu (Hospital of God), which is still a place of refuge for those for whom society does not make other provisions. In Paré's days it was a dirty and totally neglected place, and the nursing staff, composed of sisters of charity, was entirely untrained. Each bed was occupied by several patients, and the operating room was in the corner of the vestibule. It was here that Paré received the beginnings of his surgical education.

In 1536 the war, which had helped Vesalius in his decision to leave Paris, called Paré into the Army. He became a regimental surgeon, and while the French laid siege to Turin Paré saw with helpless compassion how badly mutilated and wounded soldiers whom he could not help were relieved of their suffering by being shot by an old soldier. In the course of this campaign, which reached Milan, Paré introduced his first great innovations



From *De Corporis Humani Fabrica*, 1543, by Andreas Vesalius.

concerning the treatment of gunshot wounds. Gunshot wounds were the new features of warfare, as fearful and awesome as the newest weapons appear to us now.

Gunpowder had been invented in 1320 by Berthold Schwartz and guns and cannons were in general use in the fifteenth century. In the sixteenth century muzzle-loading arquebuses had been developed, which emitted balls of the size of a walnut and inflicted horrible wounds. The earlier weapons, swords, lances, and battle axes, had made clear, open wounds that were usually but slightly infected, but the gunshot wounds were deep and narrow; they usually contained bits of clothes and filth and led to severe infections.

Somewhat earlier Giovanni de Vigo, a

on Indian Inaba type strains, for the polysaccharides of which it was found to have no affinity. There seems to be support here for the view that the combining property of bacteriophage is to be clearly distinguished from its lytic activities and, incidentally, an indication of some polysaccharide difference, not yet detected serologically, among strains of the Inaba type.

In conclusion, one further point may be raised. The ϕ LL races which have been assembled show marked differences in lytic power. They range from races of hardly discernible activity to one (received under the label cholera phage A) which causes extensive lysis. Yet the least active strain renders the originally sensitive vibrio forthwith and in perpetuity resistant to the most active. The experiment of Burnet and Lush (1936), in which in a matter of minutes after exposure to the weakly lytic phage C a staphylococcus culture became resistant to the intensely lytic derivative phage C', was readily imitated. From their experiment Burnet and Lush concluded that some positive modification of the bacterium under the influence of the bacteriophage must have occurred, that selection of naturally resistant variants was ruled out in that there had been no time for selection to operate. That in such cases resistance to the more active agent is not reached by selection must be admitted but that any positive change is wrought in the bacterium rendering it resistant is to be doubted. The obvious and highly probable explanation is that the less lytic phage, lacking nothing in combining vigour, establishes itself on the "phage receptors" of the bacterium, forbidding entry to its more destructive confrère.

Summary and conclusions

A cholera phage type here termed LL, which may be the L type but which is more probably a hitherto unrecognised entity, is possibly the most frequently occurring of Indian cholera phages. The majority at least of cultures of *V. cholerae* from Indian sources are LL lysogenic. On the other hand those Chinese and Japanese strains of *V. cholerae* which have been so far examined have been found LL free and LL sensitive. While all *V. cholerae* strains examined have been found either infected with or sensitive to LL ϕ , neither of these conditions has yet been detected in El Tor and other vibrios.

Other cholera phage types which have been isolated or propagated on LL infected strains are contaminated.

The usually feeble lytic action of LL ϕ may be enhanced by addition of egg white lysozyme to the culture medium. Two A type cholera phages which failed to multiply on Far Eastern Inaba type strains, in spite of their specific affinity for the polysaccharides of these strains, attacked the said cultures vigorously in the presence of egg white lysozyme. Where no such specific affinity existed, lysozyme failed to encourage bacteriophage.

It is suggested that the ability of a weakly lytic bacteriophage speedily to "induce" resistance to a more potent bacteriophage of the same type is due merely to blockade of the cells and not to any defensive modification of their substance. The term "blockade immunity" might be used to cover phenomena of this type.

REFERENCES

- | | | |
|--------------------------|------|-------------------------------------|
| BURNET, F. M., AND LUSH, | 1936 | <i>Austral J Exp Biol Med Sci</i> , |
| DORA | | XIV 27 |
| WHITE, P. BRUCE | 1936 | <i>Brit J Exp Path</i> , LVII 229 |

vented a number of prostheses: artificial eyes, and arms and legs which even had a mechanism to bring about their movement. He recommended and practiced postoperative massage and implanted teeth, which were taken from paid living donors.

It is interesting that this theory of the possibility of implanting teeth taken from donors persisted for several centuries after Paré. Even John Hunter practiced this method and wrote on it, expressing his complete conviction that teeth thus grafted would take root and be usable in their new environment. Altogether, most of Paré's inventions entered surgical practice sooner or later. Their impact was not as immediate as was to be expected, because of Paré's humble origin and the fact that he did not belong to the "inner circle" of scholars, but it is entirely owing to Paré that surgery became a skilled craft. Paré based his surgical operations on the anatomic writings of Vesalius and was thus the first surgeon to relate surgery to anatomy. Significantly, Paré had to keep his reliance on Vesalius' works a secret as long as Sylvius, Vesalius' teacher, was alive in Paris. Paré's position in the hierarchy of medicine was too uncertain for him to admit his spiritual fellowship with one who had disproved Galen. With the death of Sylvius this caution was no longer needed, and Paré's later writings rely openly on the works of Vesalius.

Paré's surgery remained the preferred mode of surgery for two hundred years. That is, until the arrival of the great surgical scientists of the eighteenth and nineteenth centuries. It took John Hunter to turn surgery into a science, Joseph Lister to introduce antiseptics to prevent infection, and the Americans, Long, Wells, and Morton, to provide the blessings of anesthesia and to abolish pain in operations. As was said earlier, Paré raised surgery from a trade followed by menials to a

skilled craft carried out by trained men. After Paré's time, surgery became more and more a part of medical education, and the distinction between the "surgeons of the long robe" and the "surgeons of the short robe" was broken down. Surgery and the surgeon had become respectable.

Throughout his writings one cannot help to be impressed by Paré's gentleness and humility. Over and over again he stated his credo concerning his success with every one of his patients. "I dressed his wounds—God healed him," is his recurring summary of each recovery. His accidental use of the controlled experiment led him to perform others and to be inclined toward experimentation in general. Thus, when once called to treat a man whose face had been badly burned, Paré decided to try out a remedy of which he



Anatomic plate from the works of Pietro Perretti's *Tabulae Anatomicae*, Rome, 1741.

Abstracts from Current Literature

Primary Malignant Neoplasms of the Duodenum. Ochsner, S., and Kleckner, M. S. Jr. *J.A.M.A.* 163:413, 1957.

Only radiologic diagnosis can provide early enough recognition of tumors involving the duodenum to allow resection of the lesion. While the radiologist must be particularly alert to the less common lesions of the alimentary tract, he must be equally aware of the factors that may obscure the lesions during the examination.

Of 17 duodenal lesions observed at the Ochsner Clinic, 14 were diagnosed as adenocarcinoma and 3 as sarcoma.

The tumors were classified into suprapapillary, peripapillary, and intrapapillary types, each of which has rather characteristic clinical manifestations.

Prompt surgical exploration and excision or palliative procedures should be carried out.

WILLIAM E. NORTH, M.D.

Pulmonary Cystic Disease: Physiologic Studies and Results of Resection. Siebens, A. A.; Grant, A. R.; Kent, D. C.; Klopstock, R., and Cinotti, J. J. *J. Thoracic Surg.* 33: 185, 1957.

Pulmonary cystic disease is discussed from the standpoint of interpretation of pulmonary functional tests, variability in physiologic deficit and end results of excisional therapy. Six cases are reported in detail. No characteristic abnormality accompanies pulmonary cystic disease. Large cysts may produce minimal or extensive physiologic deficits. The patency of the communication, the index of alveolar mixing and the degree of compression of the surrounding normal lung are important factors in determining the ultimate prognosis. Excisional therapy of the cysts produces excellent results from both the symptomatic and the physiologic point of view.

ERNEST G. DEBAKEY, M.D.

Pneumoperitoneum as a Space-Occupying Procedure in Conjunction with Pulmonary Resection. Bnechner, H. A.; Ziskind, M. M., and Strug, L. H. *J. Thoracic Surg.* 33:229, 1957.

In the authors' opinion a "space-occupying procedure" is not necessary after pulmonary resection from the standpoint of preventing overdistention of the remaining lung but should be considered in order to preserve pulmonary function, eliminate dead space and prevent reactivation of residual foci of tuberculosis. They are convinced that artificial pneumoperitoneum will serve this purpose. They found this procedure is selective, produces no deformity or complications and is simple to perform. It is instituted several weeks before the operation and two weeks thereafter and is maintained for two months.

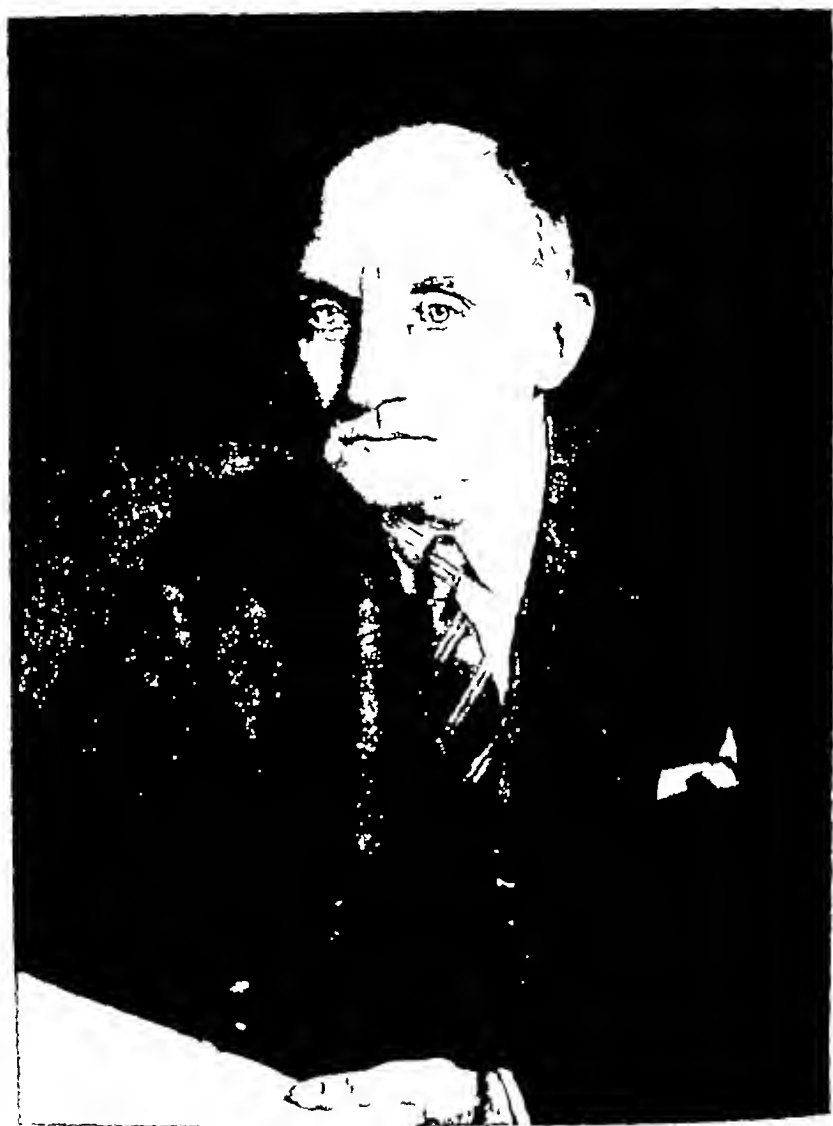
ERNEST G. DEBAKEY, M.D.

Proctosigmoidoscopy: Incidence of Polyps in 50,000 Examinations. Portes, C., and Majarakis, J. D. *J.A.M.A.* 163:411, 1957.

Proctosigmoidoscopic study was accomplished in 50,000 cases, with 1 instance only of perforation, by observing these precautions: digital examination of the rectum before inserting the instrument, blind insertion of the instrument only as far as the finger had explored, infrequent use of air inflation, special care in passing diseased segments, and care not to push the instrument forcibly against the intestinal wall until the lumen ahead had been identified. All subjects were asymptomatic and between the ages of 20 and 76. Polyps were observed in 3,952 cases. Of these, 328 were malignant. In addition, 19 instances of moderately advanced rectal carcinoma were noted.

Digital examination and proctosigmoidoscopic study are effective in the early detection of malignant neoplasm. The early removal of rectal polyps will prevent many carcinomas of the colon.

WILLIAM E. NORTH, M.D.



CATARACT SURGERY

BY

ROBERT H. G. MONNINGER, M.S., M.D.

EVANSTON, ILLINOIS

The delineations of the technique of intracapsular lens extraction as discussed in Arruga's textbook of Ocular Surgery are many ranging from the method of akinesia and anesthesia to the stages of operation and instruments used. This article will describe in general Arruga's method of cataract surgery.

Anesthesia is effected by topical instillation of 3% cocaine, or a derivative, and 1:1000 adrenalin, combined with a 1 cc. retrobulbar injection of 2% novocain, or a derivative, made through the lower lid or through the conjunctiva with the lower lid pulled downward. The Van Lint-Rochat technique for akinesia of the orbicularis muscle is employed using a mixture of 2% novocain and adrenalin. A blepharostat is used to retract the lids, and a canthotomy may be performed to further widen the lid opening. A suture is passed through the tendon of the superior rectus muscle and held by an assistant to fixate the globe. The conjunctiva and episclera of the lower hemisphere are held with fixation forceps preparatory to making the corneal section. Using a Graefe knife the puncture is made in the maximal horizontal diameter and 1 mm. from the conjunctival limbus, and the counter-puncture is made on the opposite side 1 mm. from the corneal limbus. The section is then continued in the limbus, inclining the blade upward or backward depending on whether the intent is to complete the cut in the cornea, or to leave a conjunctival flap. A central suture is placed, passing through limbal conjunctiva and the posterior edge of the section, or through the center of both lips of the wound. A knot is made and the suture is left slack. A peripheral iridectomy, or two iridotomies, one on each side of the central suture, is performed by having the assistant raise the cornea while the surgeon grasps the root of the iris with an iris forceps and cuts it with a de Wecker scissors. If blood appears in the anterior chamber, it is removed by cannula irrigation. A cataract hook is held in one hand and placed in the lower cul-de-sac while the closed lens forcep is introduced into the wound and passed across the pupil to lie on the anterior-inferior surface of the lens below the iris. The forceps is lifted and opened 4 mm. and the lens is pressed backward slightly. The forceps is closed and the lens is pulled toward the pupil and rocked from side to side. After the lens is freed inferiorly, the hook is placed at the lower limbus and moved toward the wound opening while the forceps rotation is continued. The lens is expelled, its lower surface clearing the posterior surface of the cornea and emerging first. This is the tumbling technique. The iris is replaced with a spatula and the wound suture is tied. Two more sutures are placed, one on each side of the central suture. Antiseptic and miotic ointments are instilled, and a dressing is applied with a protective device over this, and held in place with an adhesive rubber band.



The Traveling Man from Mager & Gougelman

Eddie Kerr has helped physicians fit thousands of patients with artificial eyes. Like the other experts from our offices, he provides you with technical information and assistance on difficult cases. The samples in his case will match many patients. Or, he can make eyes that perfectly match with the materials he carries. One of our experienced men visits most areas regularly—another reason to call or write our nearest office for your next ocular prosthesis.

Complete Artificial Eye Service

- Eyes custom made—glass or plastic
- Eyes from stock sent on same day order received—glass or plastic
- Damaged or broken eyes accurately matched
- Fitted to all types of maxillary implants
- Implants, X-Ray therapy shields, foreign body locators
- Superior Quality—Finest Workmanship

Mager and Gougelman, Inc.

CLEVELAND DETROIT HOUSTON (Super Branch)
KANSAS CITY MINNEAPOLIS ST. LOUIS
BOSTON PHILADELPHIA PITTSBURGH WASHINGTON



The Journal of the International College of Surgeons

FOUNDED BY DR. ANDRÉ CROTTI

Section II

Vol. XXVII

No. 4

May-June, 1957

Editor-in-Chief

Associate Editor

Consulting Editor

Assistant Editor

Max Thorek, M.D., Sc.D., LL.D., F.B.C.S. (Hon.),
F.I.C.S. (Hon.), F.P.C.S. (Hon.), F.R.S.M. (Eng.)

Philip Thorek, M.D., F.A.C.S., F.I.C.S.

Morris Fishbein, M.D., F.I.C.S. (Hon.)

Dorothy Langley










High Honors to Prof. Carlos Gama, page 3
Comments by the Founder, page 4
The Executive Director's Notebook, page 6
Who's Who in the International College of Surgeons, page 9
College Life Insurance Plan, page 11
A Trip Around the World; Second Annual Clinical Course,
International College of Surgeons, page 12
Neal Owens, M.D., F.A.C.S., F.I.C.S.
Tenth International Congress, page 24

CONTENTS

SECTION NEWS

United States Section, The President's Message, page 31
Western Regional Meeting, page 33
Eastern Regional Meeting, page 35
New York State Surgical Division, page 41
Woman's Auxiliary, page 45
Costa Rica Section, page 47
Finnish Section, page 47
French Section, page 47
Netherlands Section, page 49
Japan Section, page 50
In Memoriam, page 51

TABLE I—Physico-chemical data of certain chlorine derivatives of benzene

Substance	Formula	Molecular wt	Form.	Refractive Index	Specific gravity	M P	B P	Solubilities
Chlorobenzene *		112.5	Colourless liquid	1.52479 ²	1.1066 ^{20/4}	-45	132	0.0483 ³⁰ w, ∞ al, ∞ ot, s chl, CS ₂ , bz
1 2-dichlorobenzene (ortho) *		146.95	Colourless liquid	1.5518 ²²	1.3048 ^{22/4}	-17.5	170.80	0.0145 ⁵ w, s al, s ot
1 3-dichlorobenzene (meta)		146.95	Colourless liquid	1.5457 ⁰	1.298 ^{30/4}	-24.8	172	0.0123 ³⁵ w, s al, s et, s bz
1 4-dichlorobenzene (para) *		146.95	Monochloro leaflets from alcohol	1.5210 ⁴⁰⁰	1.4581 ⁴⁰	53	173.4	0.0079 ²⁵ w, v s h al, v s et, s bz, chl, CS ₂ , lgr
1 2 3 trichlorobenzene		181.39	Plates from alcohol	1.5671	1.574 ^{10/4}	52	210	1 w, s al, v s ot
1 2 4-trichlorobenzene		181.39	Colourless rhombic crystals			17	213	1 w, s al, v s ot
1 3 5 trichlorobenzene *		181.39	Long needles			63	208.5	1 w, s al, v s ot, s lgr
1 2 3 4-tetrachlorobenzene		215.84	Needles			47.5	254	1 w, s al, v s ot, v s CS ₂
1 2 3 5-tetrachlorobenzene		215.84	Needles from alcohol			51	246	s h w, v s al, s ot, v s CS ₂
1 2 4 5-tetrachlorobenzene *		215.84	Monochloro needles from ether		1.734 ^{10/4}	138	246	1 w, s al, s h al, s ot, s lgr
Pentachlorobenzene		250.29	Needles from alcohol		1.8342 ^{10/4}	86	277	v s al, v s et, s bz, CS ₂
Hexachlorobenzene *		284.74	Monochloro or rhombic prisms		1.569 ²² 2.044 ²²	227	326	1 w, v s al, s h al, v s al s ot, s h bz, s l s lgr

Abbreviations used in last column

h hot
w waterv s very soluble
sl slightly solubleal. alcohol
et etherbz benzene
lgr ligroinCS₂ carbon disulphide
chl chloroform

* The toxicity of these compounds has been investigated by us

High Honors to Prof. Carlos Gama

President, International College of Surgeons

To the long list of awards and distinctions earned by Prof. Dr. Carlos Gama, F.I.C.S., President of the International College of Surgeons, has been added still another, his appointment as Secretary of Health and Social Assistance of the State of São Paulo. The appointment was made by Governor Janio Quadros and was formally accepted by Prof. Gama on March 28 at the Secretariat headquarters, in the presence of many State dignitaries gathered to do him honor.

The State Secretary of Justice, Dr. Lincoln Feliciano, delivered the opening address and presided over the ceremonies that followed. The retiring Secretary of Health and Social Assistance, Dr. Coutinho Cavalcanti, then formally released the office to Prof. Gama, who expressed his appreciation in a brief but moving address.

"As I assume the responsibilities of the Secretary of Health and Social Assistance," he said, "I arrive at an extremely important point, not only in my own career but in opportunity to serve my fellowmen. . . . It is well known that I am inexperienced in State politics, but my organizational experience, on the other hand, has been fairly extensive. For some years I have been affiliated with medical organizations of various types; among these are the Neurological Section of the Associação Paulista de Medicina, which I served as Director and later as a member of the Council of the Departamento de Previdência. In 1945, at the Second Medical Congress of São Paulo, I was asked to serve as President of the old Society of Medicine and Surgery of São Paulo. Later, as one of the founders of the Brazilian Section of the International College of Surgeons, I was chosen as the first President of the Section; then, successively, I became General Secretary of the College of South America, First International Vice-President of the College and finally International President, which office I hold today.

Since the International College of Surgeons is the largest world-wide organization of its kind, I count this a high honor indeed. During the thirty years in which I have held office in our Charity Hospital I have seen many of my ambitions change from dream to reality.

"It is with the help of this experience that I hope to serve as Secretary of Health and Social Assistance in my native State, for it has taught me that to direct and to organize means to work with a group. Whatever the efforts made by the head of any group, they can be successful only when they are seconded by the loyal work of all direct helpers and members of the organization. I know and admire the work done by my predecessors in this office, and I know that the members of this secretariat are always willing to give their best efforts to the full discharge of its functions.

"I shall begin work immediately on the new and challenging task with which I have been entrusted and will do my utmost to acquit myself worthily."

Those who know Prof. Gama and have worked with him cannot doubt that he will not only acquit himself worthily but add new lustre to the office he assumes. In addition to the experience mentioned in his address, Prof. Gama has served as Professor of Neurology at the University of Bahia, Professor and Head of the Department of Neurology of the Medical School of São Paulo, Chief of the Neurologic Clinic of Santa Casa de Misericórdia and President of the Academy of Medicine. As a Fellow of the International College of Surgeons and now its President, he has spared no effort in his support of the causes he believes in. His colleagues will extend their warmest congratulations not only to Prof. Gama himself but to the State of São Paulo and the Governor thereof for his wise and perceptive choice of a leader so outstanding.

litre of p dichlorobenzene (about 17,000 parts per million) can have a detrimental effect on human beings, though severe injuries to health are as yet unknown Jordan (1932) states that o dichlorobenzene, like monochlorobenzene, is more toxic than benzene and in contact with the skin leads to severe irritation and eczema It has been stated in the *Journal of the American Medical Association* (1929, vol 1471), in reply to an enquiry from a reader, that o dichlorobenzene was found by the United States Department of Health to be safe for use as a shoe dye solvent, on the other hand, the *Industrial Chemist* (1932, vol 1 question 415) is no less emphatic that a mixture of o and p dichlorobenzene is more toxic than monochlorobenzene, although the action is similar it is advised that o dichlorobenzene be regarded as a poison

We have been unable to find any cases of fatal poisoning due to chlorinated benzenes, although Reich (1934) reports several in which toxic symptoms, including unconsciousness, followed the swallowing of puran, a trade preparation composed almost exclusively of monochlorobenzene

Methods of investigation

Since we have been concerned chiefly with the risks consequent upon the use of o-dichlorobenzene as a spray our experiments fall into two classes, (1) field experiments to determine the concentration of o-dichlorobenzene in rooms after treatment and (2) laboratory experiments in which data accumulated from (1) have been critically examined from the point of view of toxicity to animals

Field experiments

Through the kindness of Dr J MacMillan, Medical Officer of Health for Woolwich, unoccupied houses at Eltham were placed at our disposal for fumigation with o-dichlorobenzene It was first of all necessary to work out methods for the estimation of o-dichlorobenzene in air

Estimation of o-dichlorobenzene in air

A known volume of the air to be examined is swept by a current of chlorine-free air at the rate of about 1 litre per hour over a spiral of silver gauze contained in a silica tube heated to dull redness (fig 1)

The silver spiral is transferred to a suitable vessel and the deposit of silver chloride is dissolved off with ammonia (sp gr 0.88) Two extractions with ammonia are necessary The combined extracts are filtered and acidified with nitric acid and the solution allowed to stand overnight The precipitated silver chloride is collected on a Gooch crucible, washed and dried, and the concentration of dichlorobenzene vapour in the air is calculated from the weight of silver chloride

The vapour pressure of the dichlorobenzene used in these experiments was measured in the same way by determining the

WHO'S WHO IN THE INTERNATIONAL COLLEGE OF SURGEONS

Prof. Dr. Arthur Hübner, F.I.C.S.

Professor Dr. Arthur Hübner, F.I.C.S., of West Berlin-Grünwald, Germany, was born on Aug. 29, 1887. Reaching young manhood, he studied medicine at the University of Berlin. After passing his State Board examination in 1913 he specialized in surgery. His many talents soon won him recognition; in 1927 he became a lecturer at the University, and in 1930 a Full Professor of Surgery.

Professor Hübner began his active career with an outpatient clinic of his own, where most of his work consisted of the emergency surgical treatment of accidental injuries. In 1945 he was appointed Medical Director of a municipal hospital in Berlin and retained the post with great success and esteem until 1952, since which time he has been engaged in private practice.

In addition to his central routine as a surgeon, Prof. Hübner found time and energy to serve as editor of two professional journals, *Der Chirurg* and *Monatsschrift für Unfallkunde*. He is also the author of several important books, the titles of which indicate the wide range of his interests and the versatility of his character:

Lehrbuch der Gastroskopie (A Textbook of Gastrosocopy)

Lehrbuch der Frakturen und Luxationen (A Textbook on Fractures and Luxations)

Arzthaftpflichtrecht (The Liability Law Concerning Physicians)

Notoperationen und dringende Massnahmen des praktischen Arztes (Emergency Operations and Urgent Interventions Confronting the General Practitioner).

Since 1946 Prof. Hübner has been General Secretary of the German Surgical Society.

The possessor of well-merited national and international distinction, Prof. Hübner has never for a moment lost sight of



Dr. Arthur Hübner, F.I.C.S.

the essential purpose of every Physician's and surgeon's career, the healing of injuries and diseases. Through his regular practice, his lectures, his books and his organizational activities this thread runs clear and strong. As a Fellow of the international College of Surgeons he is keenly aware of the world's great need for widely shared knowledge of surgical technic and dissemination among physicians and surgeons everywhere of all available data on research, new remedies, and modern surgical technics. He is first and foremost a surgeon, but he remains a student, both of surgery and human affairs, as is evident from his remarkable treatise on medico-legal problems. A severe critic of a

rooms were sealed for 24 hours and then ventilated by opening doors and windows. At the end of 20 hours samples of air for analysis were taken from each of the rooms. Sampling was continued

TABLE II

Effect of ventilation and room closure on dispersal of fumigant

Time of observation.	Percentage of ortho-dichlorobenzene in air	
	Room I	Room II.
End of ventilation period	0 012	0 019
Closed 1 hour	0 026	0 025
" 2 hours	0 026	0 025
" 3 "	0 020	0 032

daily for 6 days and the rooms were then closed again for another 9 days, further samples of air were taken at the end of this period. The results are shown in table III.

TABLE III.

Effect of ventilation on dispersal of fumigant

Hours of ventilation.	Percentage of ortho-dichlorobenzene in air	
	Room I.	Room II
	Fumigant—ortho-dichlorobenzene	Fumigant— $\left\{ \begin{array}{l} \text{paraffin} \\ \text{methyl salicylate} \\ \text{ortho-dichlorobenzene} \end{array} \right.$
20	0 011	0 009
48	0 006	0 005
72	0 005	0 005
96	0 002	0 002
120	0 003	0 003
144	0 002	0 002
15 days	0 002	0 001

The smell of dichlorobenzene could be detected in room I at the end of 15 days whilst room II smelt of methyl salicylate. It is thus evident that it is extremely difficult to remove traces of dichlorobenzene from a room even after prolonged ventilation.

Laboratory experiments

We have worked with healthy, fully grown rats, mice, guinea-pigs and rabbits, all of which were bred in the laboratories of University College Hospital Medical School. About 200 animals have been used. o-Dichlorobenzene was administered intravenously, subcutaneously and by inhalation. With the two former methods strict asepsis was maintained. Small quantities were introduced in liquid paraffin or ligroin. Animals were killed



Scene in Tokyo, October 24. Left to right, Mr. Kimura, head of rug company; Prof. Dr. S. Kikuchi, F.I.C.S. Dr. H. Shiota, F.I.C.S. (Hon.), President of Japan Section, and Mrs. Kimura. Beautiful rug in background will be presented to the International Surgeon's Hall of Fame for its Japanese room. [On the occasion of the Second Around-the-World Postgraduate Surgical Clinics Trip of Members of the International College of Surgeons.]

the true Japanese spirit. This gesture on the part of so highly respected and so lovable a man was one of our most impressive experiences.

The meeting that morning was held at Tokyo University, where we saw an amazing example of Prof. S. Kimoto's brain-cooling surgical technic. The organization and teamwork Dr. Kimoto achieved while performing his difficult operation were an inspiration.

The morning was memorable also for five other operations performed at the University of Tokyo. We were then con-

ducted to the Tokyo Women's Medical College at Shinjuku, where we saw an impressive demonstration of the work of Dr. S. Sakakibara in solving some difficult problems of cardiac surgery. A full day of medical demonstrations was enjoyed by the entire party.

After the last demonstration the group returned to the hotel, and that evening all members of our party, including their wives, were entertained by a local Japanese group at a delightful dinner. After a short night's rest, we were called early next morning and taken by bus from the Imperial Hotel in Tokyo, through the



Scenes at Tokyo University. Above, a motion picture shows a cardiac operation by Prof. S. Kimoto. Below, left to right, Dr. H. Shiota, Dr. Owens and Dr. S. Kikuchi. [On the occasion of the Second Around-the-World Postgraduate Surgical Clinics Trip of Members of the International College of Surgeons.]

a large aspirator bottle (PC) loosely packed with pledgelets of cotton wool and serving as a filter for the fine spray of lubricating oil from the motor as well as a pressure reservoir

The apparatus is designed to deliver two streams of air, one pure, the other saturated with *o*-dichlorobenzene at the temperature of the experiment. By mixing the two any required concentration may be obtained.

If air is bubbled through commercial *o*-dichlorobenzene to saturation at 25° C, then on account of the complexity of the mixture the initial concentration of total chlorobenzene is about 20 mg per litre. After 6 hours this falls to 12 mg per litre as the more volatile constituents are preferentially removed, after a further 6 hours it attains a constant saturation of 6.3-6.4 mg per litre, corresponding to a concentration of 0.11 per cent *v/v* of *o*-dichlorobenzene. This figure is dependent on the vapour pressure and will thus be rather lower at the more common room temperature of 16°-17° C. Direct chemical analysis has shown that this constant saturation at 17° C is 0.08 per cent and this figure has been taken as the basis for all our dilutions. It is essential that constant concentration shall be reached before commencing the experiment proper and in all our experiments the apparatus was run for an initial control period of 18 hours. Once the more volatile constituents have been removed, the concentration will remain constant for many days and it is unnecessary to refill the saturators for each experiment.

The air is saturated by being bubbled through two wash-bottles (S_1 , S_2), each containing about 200 ml of *o*-dichlorobenzene, and is then passed upwards through an aspirator packed with cotton wool saturated with the liquid (S_3). By this means we have been able to ensure saturation over long periods and have prevented any liquid spray being taken over into the meters. The cotton wool is saturated by filling the bottle with the liquid and pouring off all that is not absorbed. If this precaution is not taken some parts of the wool will not be saturated and will absorb the vapour from the air, thus rendering the concentration inaccurate.

The rates of flow of the two streams of air are measured by two Venturi meters (M_a , M_b in fig 2) *. These consist of a main

* The Venturi meter is a practical application of Bernoulli's theorem which states that the energy of any fluid particle moving in an even flow is given by

$$\frac{P}{W} + \frac{v^2}{2g} + z = k$$

where P = pressure

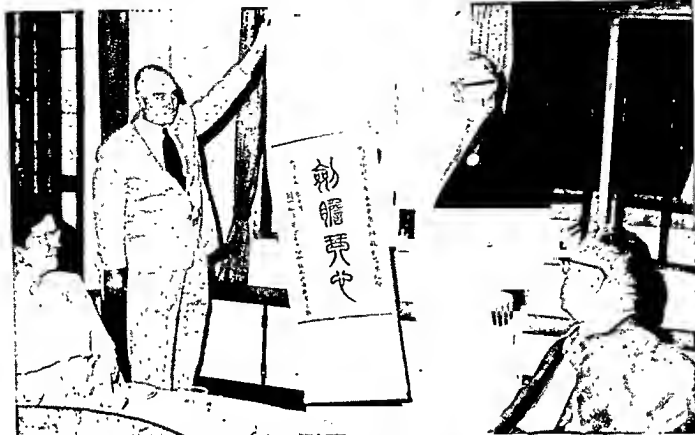
W = weight of unit quantity of fluid

v = velocity of fluid

g = gravitational force

z and k are constants

In a converging cylindrical tube such as is present in the meter immediately before the constriction (fig 4), it can readily be shown (Gibson, 1925) that



Presentation of scroll to Dr. Neal Owens in Hong Kong. [On the occasion of the Second Around-the-World Postgraduate Surgical Clinics Trip of Members of the International College of Surgeons.]



Visiting Fellows in the Philippines, after meeting with Dr. Quintos, Director of the Philippines General Hospital. [On the occasion of the Second Around-the-World Postgraduate Surgical Clinics Trip of Members of the International College of Surgeons.]

is calibrated with a spirometer before use, the pressure difference being plotted against rate of flow per hour. To control the rate of flow each meter is provided with a tap on either side (T_3, T_5, T_2, T_4 in fig 2). For all experimental work with o-dichlorobenzene the taps should have a minimal amount of lubricant on the shanks only, to prevent absorption of the gas.

To obtain any required mixture, say 0.04 per cent, all that is necessary is to adjust the pressures to correspond to equal volumes of the gas, the concentration of the saturated gas being 0.08 per cent.

From the meters the two streams are mixed and passed upwards through a short tower containing glass beads (MC). Control observations have shown that the beads do not cause any condensation nor effect any alteration in the concentration of the mixture. The animal chamber (AC) is a 35-litre thick glass container with

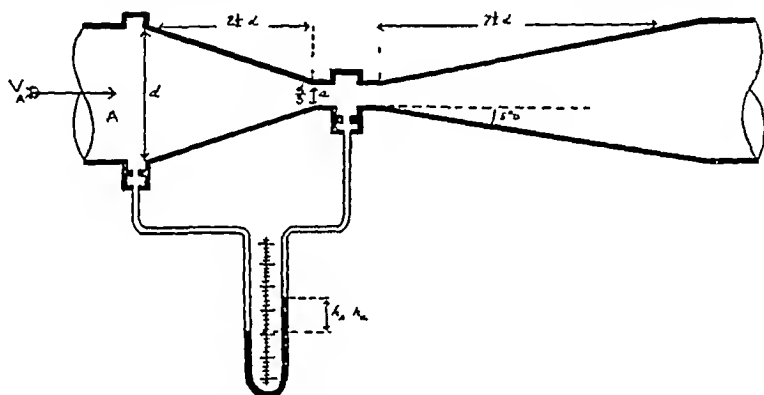


FIG 4.—Diagram illustrating theoretical construction of a Venturi meter (see text). V_A = velocity of flow of fluid or gas at entrance, A and a = the respective areas of entrance and throat, d = diameter of main pipe, $h_A - h_a$ = pressure difference at entrance and throat expressed in inches of water. (After Gibson.)

the inlet and outlet on opposite sides and below and above respectively. The floor is covered with a thin layer of sawdust for the comfort of the animals, as controls in an empty chamber showed that the gas is not absorbed by the sawdust. The gas passes in at the bottom of the chamber and out at the top on the other side, when it is washed twice with absolute alcohol (A) and finally passed to the exterior through a flowmeter (F) which serves as a check on the total flow during the whole experiment. The animal chamber is provided with a manometer (M) and a thermometer, the latter being placed high up near the roof.

Fig 2 also shows a control cage (CC) which is used for keeping the animals in a current of pure air. With this apparatus it has been possible to keep a constant concentration of 0.005 per cent (50 parts per million) of o-dichlorobenzene for 48 hours at a rate of 160 litres total flow per hour. The apparatus is provided with

during the afternoon, at which papers were presented by Dr. Kahn, Dr. Mun-awar Ali and Dr. Z. K. Kazi. A luncheon at the Karachi Boat Club was given in our honor by Parke Davis and Company, with Mr. and Mrs. E. V. Hopkinson as host and hostess.

The next stop was the Hotel Caravan in Teheran, Iran, where we arrived on Saturday, November 17. On Sunday, November 18, a charming dinner was proffered us at the Hotel Metropole by the Iranian Section, whose Secretary, Dr. E. Hazrati, was most helpful throughout. Here we made the acquaintance of Prof. Dr. Y. Abr, President of the Section; Dr. M. A. Sabr, President-Elect, and Dr. G. H. Mossadegh, Vice-President. Also present were General Dr. Nabjaf-Zaveh, Dr. M. Tezechvan, Dr. Essamly, Dr. N. Zarrabi and Dr. N. Ameli. On Sunday, November 18, under the able management of Prof. Abl and Dr. Hazrati, an interesting program was offered by the Iranian Section in collaboration with Dr. A. V. E. Ghbal, President of the University of Teheran and Minister of the Imperial Court. In connection with this meeting we also met Dr. J. H. Saleh, the Minister of Health.

We visited various surgical services and the Cancer Institute of the Pablavi University Hospital, where we watched Dr. Essamly operate for a cyst of the brain with multiple cysts of other organs. Later, at the Conference Hall of the University, we attended a scientific meeting with a series of excellent presentations. In the evening we attended a dinner given for us by the President of Teheran University, at the University Club.

Leaving Teheran with many regrets, we arrived in Istanbul Monday afternoon and were met at the airport by a group of Turkish surgeons, headed by Dr. Arel, President of the Turkish Section, and including Drs. Gurkan, Gorbon, Sezer, Nadiplju and Maniyabe. Our party was then checked into the Istanbul-Hilton Hotel, where on Tuesday we were met and called for by Dr. Arel and his associates and taken to the First Surgical Clinic of the University of Istanbul, which is the Cerrah Pasa Capital Hospital. There we saw many outstanding operations performed by Dr. Arel. Included were an operation for pericarditis, a "blue baby" procedure, cholecystectomies, operations for pyloric stenosis, etc. The clinical



Three Fellows of the College Arrangement Committee of the Turkish Section. At right, wearing hats, Dr. Neal Owens and Prof. Fabri Arel. [On the occasion of the Second Around-the-World Postgraduate Surgical Clinics Trip of Members of the International College of Surgeons.]

animals showed liver damage, whilst many also displayed injury to the kidneys. Even half-an-hour's exposure to 0.039 per cent can produce liver necrosis in some animals. During exposure the animals sit huddled together in a drowsy condition, frequently showing irritation of the eyes and nose. A fairly long period of coma precedes death.

TABLE IV
Toxicity of inhaled o-dichlorobenzene

Animals	No of animals	Percentage concentration of o-dichlorobenzene	Exposure in hours	Dead	No showing liver necrosis	Remarks
Rats	10*	0.080	11.50	1	5/5†	2 very ill when killed
	15	0.039	3.12	1	12/12	
	6	0.039	1.1	0	3/6	
	6	0.013	25	1	3/3	2 moribund when killed
	6	0.010	24.48	0	4/6	
	6	0.005	24	1	3/3	
Mice	10	0.005	24	1	10/10	All very ill when killed
Guinea pigs	2	0.080	24	2	2/2	Very ill after 9 hours

* Chemically pure o-dichlorobenzene used in this group. In the remaining experiments commercial o-dichlorobenzene was used.

† 5/5 means that 5 animals out of 5 examined showed liver necrosis.

With subcutaneous administration gross liver damage results after doses of 0.1 c.c. (0.5 c.c. per kg. body wt.) and may occasionally be produced with 0.001 c.c. (0.0056 c.c. per kg. body wt.).

Intravenous injection of 0.5 c.c. (0.25-0.5 c.c. per kg. body wt.) kills rabbits in 24 hours, 1.0 c.c. in twenty seconds. The minimal lethal dose for mice determined by intravenous injection (50 per cent mortality) is about 0.4 c.c. per kg. body wt.

Pathological changes in experimental o-dichlorobenzene poisoning

1. The liver shows a series of changes varying from patchy hydropic degeneration of liver cells and slight fatty change to intense focal and sometimes confluent massive necrosis (figs. 6-9). Cells around the central veins of the lobules or in the mid-zonal areas are first affected. The extent of the lesion is roughly proportional to the dosage and, up to a point, to the time after exposure, the maximal changes being seen usually in 24-48 hours. Small and medium sized necroses are rapidly removed, the liver returning to normal in the course of a few days. In fatal cases the greater part of the liver may be destroyed.

There is nothing characteristic about the pathology of the damaged liver cells. Haemorrhages are rare except in mice. No



Opening session of the Tenth International Congress.



Audience with His Excellency the President of Mexico during the Tenth International Congress.

that the scientific program was remarkable in both quality and quantity.

Another Committee also deserves high honor, namely the Reception Committee, of which Dr. Eduardo M. Morgenstern was Chairman, Dr. Mario Gonzalez Ulloa Vice-Chairman and Dr. Oscar E. Davila, Dr. Agustin Diez de Urdanivia, Dr. David Gutierrez Garcia, Dr. H. P. de Kanter and Dr. Raul Santos Mazal assisting. More than one visiting surgeon may have felt privately that "Royal Reception Committee" would be scarcely an exaggeration, for a right royal welcome. Sharing these amenities on the feminine side was the Committee headed by Doña Gloria S. de Manzanilla, with Doña Guadalupe D. de

Chavira and Doña Maria S. de Fonseca as Vice-Chairmen, Doña Emma M. de Mora as General Secretary and Doña Gertrudis A. de Manzanilla as Auxiliary Secretary. One of the pleasantest features of all Congresses is the opportunity it affords for busy surgeons' wives to enjoy the company of their husbands and that of their friends and fellow-workers for the advancement of the profession.

Since the first day of the Congress, February 24, is Mexico's Independence Day, the visiting Surgeons, accompanied by a full Guard of Honor, proceeded to the Columna de la Independencia, Paseo de la Reforma, to lay a wreath on the national monument to Mexico's heroes of independence.



His Excellency Morones Prieto, F.I.C.S., Minister of Health of Mexico, receiving honorary diploma from Prof. Carlos Gama, President of the International College of Surgeons, and Prof. Manuel A. Manzanilla, Chairman of Arrangements for the Tenth International Congress.

F.I.C.S., of Philadelphia; Dr. Peter A. Rosi, F.A.C.S., F.I.C.S., of Chicago; Dr. Samuel R. Perzik, F.A.C.S., F.I.C.S., of Los Angeles; Dr. Moses Behrend, F.A.C.S., F.I.C.S., of Philadelphia; Drs. Saul Shapiro, F.I.C.S., and Daniel H. Manfredi, F.I.C.S., of New York; Dr. Sidney A. Rosenburg, F.I.C.S., of Pittsburgh; Drs. Emanuel M. Skolnik, F.A.C.S., Morris T. Friedell, F.A.C.S., F.I.C.S., Claude M. Lambert, and August F. Daro, of Chicago; Dr. James F. Dowd, F.I.C.S., of St. Louis; Dr. Salvador Castanares, of Los Angeles; Dr. Clifford L. Kiehn of Cleveland; Dr. Hebert G. Cohen, F.I.C.S., of New York; Dr. Carlos Scuderi, F.A.C.S., F.I.C.S., of Chicago; Dr. Joseph C. Risser of Los Angeles; Dr. George L. Kraft of Hollywood and Dr. Daniel H. Levinthal of Beverly Hills, California; Dr. Robert J. Kisitchek of Los Angeles; Dr. Philip Thorek, F.A.C.S., F.I.C.S., of Chicago; Dr. Otto L. Bettag, Head of the Illinois Department of Public Health, Dr. Joseph da Silva of the State

Hospital, and Dr. Leonard Krasner, Consultant in Thoracic Surgery to the Department of Public Health, all of Chicago; Dr. James M. Owens, F.I.C.S., of Phoenix, Arizona; Dr. Aaron N. Gorelik, F.I.C.S., of New York; Dr. Herman O. McPheeters, F.A.C.S., F.I.C.S., of Minneapolis; Dr. Arthur Dallos, F.I.C.S., of New York; Drs. Philip S. Kline and Hesiquio N. Gonzalez, of San Antonio; Dr. Philip M. Marcus of Beverly Hills, California, and Dr. Louis T. Palumbo, F.I.C.S., of Des Moines, and Dr. Juan Negrin, F.I.C.S., of New York.

Among the European participants were Prof. Dr. Claude H. Carron, Laureate of the Faculty of Medicine, Paris; Prof. Dr. Alfonso de la Fuente of the Faculty of Medicine, and Prof. Dr. Francisco Martin Lago, F.I.C.S., Madrid; Dr. T. A. Dunkersloot of Sneek, The Netherlands, and Prof. Dr. Stefano Tenefi and Prof. Dr. Domenico Dazzoni of Turin.



Prof. Dr. Nahor Carrillo, Dean of the National Medical University of Mexico, delivers presentation, "Abscess of the Liver."

WESTERN REGIONAL MEETING AN OUTSTANDING SUCCESS

The April meeting held at the Las Vegas Hacienda, in Las Vegas, Nevada, by the Western Region of the United States Section of the International College of Surgeons, was more than well attended and will be long remembered for both the excellence of the scientific program and the great pleasure afforded by the well-planned social events.

The official program covered a number of vitally important surgical fields. Drs. Irving L. Lichtenstein, F.A.C.S., F.I.C.S., and Martin S. Levy, of Beverly Hills, California, offered a presentation on hyperthyroidism. The subject chosen by Drs. A. Bernstein, F.I.C.S., and Henry C. Bernstein, F.I.C.S., of San Francisco, was *An Historical Review of Cesarean Section*. Dr. Frank E. Polmetz, F.A.C.S., of Sherman Oaks, California, discussed the causes of imperfect results in the surgical treatment of protruding lumbar and cervical discs. Modern advancements in the treatment of common fractures were outlined by Dr. Reed S. Clegg of the University of Utah School of Medicine, Salt Lake City. Other members of the same faculty who participated were Drs. Preston J. Burnham, F.A.C.S., Thomas R. Broadbent, F.I.C.S., Mark H. Greene Jr., N. Frederick Hicken, F.A.C.S., F.I.C.S., A. James McAllister, Vernon L. Stevenson, F.A.C.S., Howard P. House, F.A.C.S., F.I.C.S., William F. House, Edward R. McKay, F.I.C.S., J. W. Mortensen, H. R. Warner, Perston J. Cutler, William Ray Rumel, F.A.C.S., L. George Veary, Robert G. Weaver, F.A.C.S., and Adolph M. Nielsen. Their topics were as follows: Dr. Burnham, *A Physiologic Treatment of Fractures in the Hand*; Dr. Broadbent, *Intra-Oral and Extra-Oral Muscles: Their Effect on the Alveolar Ridge*; Dr. Greene, *Wringer Injuries*; Drs. Hicken and McAllister, *Accidental Injuries of the Bile Ducts*; Dr. Stevenson, *Early Surgical Treatment of Acute Cholecystitis*; Drs. William F. and Howard P. House,

Stapes Mobilization for Restoration of Hearing; Dr. McKay, *Refinements in the Surgical Treatment of Fistula-in-Ano*; Drs. Mortensen and Warner, *Clinical Quantitation of Aortic Insufficiency and Aortic Stenosis*; Drs. Mortensen, Cutler, Rumel and Veary, *Management of Coarctation of the Aorta in Infancy*; Dr. Weaver, *The Surgical Treatment of the Diseased or Injured Ureter*, and Dr. Nielsen, *Mecconium Peritonitis*.

Dr. Harry Alban, F.A.C.S., F.I.C.S., of Long Beach, California, addressed the assembly on the use of ultrasonation in orthopedic practice; Dr. Edward S. LaMont, of Hollywood, on plastic surgery, both functional and cosmetics. Dr. James H. Saint, F.A.C.S., of Santa Barbara, California, spoke on acute volvulus of the cecum, and Dr. James J. Morrow, F.I.C.S., of North Hollywood, on acute pancreatitis. Dr. Lawrence Braslow, of Riverside, California, discussed closure of the duodenal stump. A plea for wider use of spinal anesthesia was presented by Dr. Elliott M. Feigenbaum of San Francisco.

From the College of Medical Evangelists, Los Angeles, were Dr. Donald C. Collins, F.A.C.S., F.I.C.S., Assistant Professor of Surgery, who spoke on the present status of histoplasmosis in the West; Dr. H. H. Edelbrock, Associate Clinical Professor of Urology, with a presentation on hypospadias, and Dr. S. L. Perzik, F.A.C.S., F.I.C.S., Associate Clinical Professor of Surgery, who discussed the place of radical neck dissection in the management of carcinoma of the head and neck.

Chemodissection: A Three-Dimensional Supplement to Surgery of the Breast was the title dealt with by Drs. Ralph L. Byron Jr., Keith H. Kelly and Howard R. Bierman, all of the City of Hope Medical Center, Duarte, California. Dr. Byron is Chief of Surgery and Director of the Hospital for Tumors and Allied Diseases; Dr. Kelly, Chief of the Section on Oncology, and Dr.

3 successive doses of 1 c c (*i.e.* 0.5 c c per kg body wt) Typical blood changes are shown in fig 12 There is no marked alteration in the red cell count or hæmoglobin

II OTHER CHLORINE COMPOUNDS

Our study of these compounds has been restricted to subcutaneous and intravenous introduction into rats and the methods of investigation of material are similar to those described in part I The solid compounds, para-dichlorobenzene, trichlorobenzene and tetrachlorobenzene, were dissolved in liquid paraffin or ligrom, neither of which produced significant changes in the organs of control animals Hexachlorobenzene was introduced in the form of an emulsion with tragacanth Doses ranged from 0.5 to 0.001 g

The results may be stated briefly No animals died from the doses administered With monochlorobenzene, slight changes in the liver and kidneys similar to those produced by o-dichlorobenzene were obtained with doses as small as 0.02 g p-Dichlorobenzene occasionally produced slight liver necrosis in doses of 0.005 g Slight liver damage occurred after the administration of 0.5 g trichlorobenzene Tetrachlorobenzene and hexachlorobenzene, by contrast, could be administered in such large quantities as 0.5 g without producing any toxic effects

With benzene alone, we found that the smallest dose to produce slight changes—fatty degeneration and necrosis in the liver of rats—was 0.2 g It thus appears that monochlorobenzene is more toxic to animals than benzene, whilst o- and p-dichlorobenzene are more toxic than monochlorobenzene On the other hand, the more fully halogenated derivatives appear to be very much less toxic than benzene Susceptibility varies greatly in animals, even in members of the same litter The order of toxicity for the group appears to be benzene < monochlorobenzene < o-dichlorobenzene > trichlorobenzene > tetrachlorobenzene > hexachlorobenzene This suggests the order of toxicity found by Tattersfield (1927) for certain insects, *viz.* benzene < monochlorobenzene < o-dichlorobenzene < 1,2,4-trichlorobenzene > 1,2,4,5-tetrachlorobenzene Some general biological action thus seems to be indicated Monochlorobenzene, like benzene and o-dichlorobenzene, produces a marked fall in the leucocyte count of rabbits Thus in one animal given 1 c c monochlorobenzene on three successive days the white cell count fell from 7500 to 1850 in a week, slowly returning to normal

The Newer Developments in

Orthopedic Surgery 11:30-12:00 a.m.
Edward L. Compere, M.D., F.A.C.S., F.I.C.S. (Hon.), D.A.B., Professor and Chairman, Department of Orthopedic Surgery, Northwestern University Medical School; President-Elect, United States Section, International College of Surgeons; Chairman, International Section, Orthopedic Surgery, International College of Surgeons; Secretary, Qualification and Examination Council, International College of Surgeons, Chicago, Illinois

Symposium

Management of Neck, Shoulder and Arm Pain 12:00-12:30 a.m.
Moderator: Edward L. Compere, M.D., F.A.C.S., F.I.C.S. (Hon.), D.A.B., Professor and Chairman, Department of Orthopedic Surgery, Northwestern University Medical School, Chicago, Illinois
Charles Bradford, M.D., Consulting Orthopedic Surgeon, Faulkner, Milton, Mt. Auburn Hospitals and Massachusetts Hospital for Crippled Children, Boston, Massachusetts
Joseph F. Dorsey, M.D., F.A.C.S., F.I.C.S., D.A.B., Instructor Neurosurgery, Tufts University Medical School, Boston, Massachusetts

Samuel S. Handlig, M.D., D.A.B., Instructor, Orthopedic Surgery, Tufts University Medical School; Instructor in Surgery, Harvard Medical School, Boston, Massachusetts

Luncheon 12:30-2:00 p.m.

Afternoon Session

Presiding: George Stanley Miles, M.D., F.A.C.S., F.I.C.S., Somerville, Massachusetts
Secretary: George Robbins, M.D., F.I.C.S., Boston, Massachusetts

Hospital Architecture

Hospital in the Round: A New Concept in Design 2:00-2:45 p.m.
Joseph L. Eldredge, A.I.A., Boston, Massachusetts

Question Period 2:45-3:00 p.m.
"What's New" 3:00-3:10 p.m.

M. Leopold Brodny, M.D., F.A.C.S., F.I.C.S., D.A.B., Assistant Professor of Urology, Tufts University Medical School; Regent of Massachusetts, United States Section, International College of Surgeons, Boston, Massachusetts

Urologic Surgery

Arteriovenous Aneurysm of the Kidney 3:10-3:30 p.m.
Hamilton Fontoura, M.D., Rio de Janeiro, Brazil; Howard A. Hoffman, M.D., F.A.C.S.,



View of The Balsams. The Switzerland of America, Dixville Notch, New Hampshire, where the Eastern Division of the International College of Surgeons will hold its annual scientific, educational and recreational meeting July 1-6, 1957.

- | | | |
|--------------------------------------|------|---|
| PETERSON, A | 1920 | 21 Rep New Jersey Agric Stat , 378 |
| " | 1922 | <i>Rev Appl Ent</i> , A x 610 |
| REICH, H | 1934 | <i>Schwicz med Wschr</i> , xv 223 |
| SNYDER, T E | 1926 | US Dept Agric Fmrs Bull , no 1477 |
| " | 1928 | <i>J Washington Acad Sci</i> , xviii 381 |
| " | 1933 | US Dept Agric Leaflet, no 101 |
| ST GEORGE, R A , AND BEAL, J A | 1932 | <i>J Econ Ent</i> , xxv 713 |
| TATTERSFIELD, F | 1927 | <i>J Agric Sci</i> , xvii 181 |
| TATTERSFIELD, F , AND ROBERTS, A W R | 1920 | <i>Ibid</i> , x 199 |
| VEDDER, E B | 1925 | The medical aspects of chemical warfare, <i>Baltimore</i> |

Woman's Auxiliary

PRESIDENT'S MESSAGE

Getting Acquainted



Mrs. Clifton L. Dance

Our page in the March-April *Bulletin* was planned to acquaint the members with their officers and various committees. In this issue I should like to introduce your Regional Vice-Presidents.

In a sense, the Regional Vice-President in your section of the country is your particular representative, and she can best serve her Section and you if you make yourself known to her. For instance, permit me to quote from an excellent report made by Mrs. V. T. DeVault on the Regional Meeting held at the famous Greenbrier Hotel in White Sulphur Springs, West Virginia. Mrs. DeVault is one of the Regional Vice-Presidents for the Mid-Atlantic Section, and she represented the Woman's Auxiliary at this meeting. She writes:

"Surgeons' wives from the Gulf of Mexico to the Great Lakes and from the Atlantic Ocean to west of the Mississippi River came together, renewed old friendships and made new ones. The General Chairman for the Woman's Auxiliary was Mrs. Elbyrne Gill, who, with her co-chairmen, Miss Jean Gill, Mrs. Francis McGovern, Mrs. Charles Easley, Jr., Mrs. J. G. Jantz, Mrs. Andrew F. Giesen, Mrs. Edgar W. Weaver and Mrs. George Bourne welcomed the ladies who attended (about 100) and arranged for them to enjoy the events that had been planned.

"A tour through this fabulous hotel delighted both the homemakers and the party-givers among us; from the stainless steel kitchens, so efficiently run, to the wing where President Eisenhower met the

Canadian Prime Minister. For those who liked bridge and canasta, events were arranged with prizes for each table. Many availed themselves of the curative baths and massages, while the out-of-doors ladies had walks, golf and auto trips to nearby points of interest. The shopper is always with us, and the lovely Greenbrier shops were a delight. Some of our more studious women attended the doctors' lectures. The Auxiliary will be happy to learn that we have gained new members from this fine group."

We are most grateful to Mrs. DeVault, for her report shows that the Regional meetings are a golden opportunity for surgeons to combine a few days of change and rest with the continuous study imposed by their dedicated profession. For our women, these meetings are also far more than a vacation at a delightful hostelry. We meet other women toward whom we feel a collective kinship, a warmth and satisfaction that enrich these particular holidays, because we know that our husbands also find a rewarding satisfaction in these "get-togethers" and discussions with their colleagues.

The Regional Meetings bring the College to you, wherever you are located. There are no "remote Sections." The State Regents of the College have been planning these meetings in such charming and historically interesting places that the location itself becomes an added attraction. By the time this article sees print, the next Regional Meeting (April 7-10, 1957) of the Great Lakes Division and the Indiana State Section will have taken place. Dr. Andrew Bowen, Regent for Kentucky, has scheduled this meeting at another magnificent hotel, the French Lick Sheraton, French Lick, Indiana. California State Chapter will h at

we killed the animals by a sharp blow on the neck and fixed small pieces of liver in 70 per cent alcohol, staining paraffin embedded sections with hæmatoxylin and eosin and by van Gieson's method. Acting on Professor A. E. Boycott's suggestion we found that immediate fixation in boiling water gave excellent preservation of blood filled capillaries and small vessels.

For observations on the hepatic circulation we fitted up a simple perfusion apparatus consisting of a reservoir holding normal saline maintained at 37° C and a saline bath in which the liver was suspended. The hepatic artery was tied off and the organ perfused through the portal vein at a constant head of pressure.

Although most of our observations were made with chloroform and carbon tetrachloride, we have obtained similar results with the various aliphatic and aromatic substances shown in the table on page 297. For the most part these were introduced without any dilution in quantities varying from 0.025 to 0.1 c.c. Smaller quantities were diluted with liquid paraffin or ligroin, previous experiments having shown that quite large amounts of these substances can be injected into the portal circulation without liver damage.

RESULTS

1. *Changes in the liver*

Within a few seconds tiny white rings appear along the anterior margins of the liver, rapidly giving place to rounded white patches.* Whole areas of a single lobe quickly become affected and within 5 to 10 minutes resemble huge infarcts, with clearly defined irregular margins. Often two or three such areas fuse or are separated by tissue showing the ring pattern. All of the lobes may be simultaneously involved; there is no constant rule of distribution. Microscopical examination shows marked congestion of the vessels in the portal canals and of the hepatic veins. Sinusoids are widely dilated and contain intact red corpuscles. Small hæmorrhages are sometimes found around the portal canals. No thrombi are present in any of the vessels. There is no apparent alteration in the liver cells.

Within an hour the first signs of necrosis of liver cells appear, scattered throughout the future site of the "infarct." Rounded areas showing nuclear pyknosis and marked swelling of cells occupy part of a lobule, most frequently the periphery, and commencing leucocytic infiltration is seen at the edges of these areas.

In three hours fairly well defined necrotic areas are seen in many lobules, some showing a tendency to fuse. The outline of the future infarct is however indistinct. Although the cells are greatly swollen, often vacuolated, with pyknotic nuclei, the trabecular arrangement is retained. Vessels are dilated, sinusoids even in the necrosed areas containing blood.

* The nature of this "white" change is somewhat of a puzzle, for the affected areas contain blood. Moreover, a similar change is seen in perfused livers in which no blood is present in the vessels. We think there is loss of transparency in the damaged cells, with opaqueness.

the Esophagus

Dr. Barbin, Nantes: *Permanent Intubation in Inoperable Carcinoma of the Esophagus*

Dr. Bouvier, Reims: "Good" and "Bad" Gastrectomies

At 12:30, luncheon will be served in the Pommery Caves or ad libitum.

At 2 p.m. Dr. Jerome J. Moses, of Chicago, will present *Problems in Hepatobiliary Disorders*.

After another visit to the exhibits at 4 p.m., followed at 6 p.m. by a visit to the Saint-Remi Basilica and the Cathedral, dinner will be served at the Pommery Caves at 8:30.

For Sunday, May 26, three different programs have been arranged, according to the desires of the participants.

1. Religious Services

At the Cathedral: 8:30, 10, 11:45

At the Temple: 10:30

2. 9-11 a.m.: Scientific Papers

Visit to the Regional Center of Malignancies, conducted by Prof. LeFèvre, Director

3. Visit to the Center of Thoracic Surgery at Châlons; scientific session by Dr. Monod

Transportation will be provided.

Other Communications

Endoscopic Films

Prof. Raymond Darget, Bordeaux: *Radium*

Therapy of Malignant Tumors of the Urinary Bladder

1. *Tumors Limited to the Bladder*

2. *Infiltrating Tumors*

Prof. DeCoulx, Lille: *Fractures of the Calcaneus*

Surgery of the Genitourinary Organs

Prof. Darget and Dr. De Castelmur, Bordeaux: *An Experimental Study in Ureteral Plastics by Means of Arterial Homografts*

Dr. LeCocq, Clermont-Ferrand: *Evaluation of the Danger of Hemorrhage and Thrombo-Embolicisms During Prostatectomy*

Dr. Van Keerbergen, Brussels: *Discussion of Ureteral Plastics*

Dr. Dufour, Paris: *Ureteral Plastics Endocrinology, Biology, Cancerology*

Dr. Brenier: *Problems in the Surgery of Malignant Disease*

Prof. Darget and Dr. Lämarche, Bordeaux: *Irradiation of the Hilum of the Prostate with Radioactive Isotopes in Cancer of the Prostate*

Prof. Despons, Bordeaux, and Dr. R. Gauducheau, Nantes: *Lympho-Epithelioma of the Tonsil (Projections)*

Medical films will be shown without interruption during the congress, in a special room.

NETHERLANDS SECTION

The first refresher course in Anesthesiology offered in the Netherlands was held in January 1957 at Boerhaave-kwartier, Leyden, under the direction of Dr. L. A. Boere, F.I.C.S. A comprehensive program of instruction was given, dealing with anesthesiology in all its main aspects: its use in cardiac surgery, its relation to hypotension in general and plastic surgery, its effect upon the respiratory tract. Hypothermia was fully discussed; its induction, its biochemical aspects, its postoperative phase and its physiologic effect.

On the final day of the course a number of excellent clinical and laboratory demonstrations were given in the fields of anatomy, physiology, pathology, hemodynamics and defibrillation.

Assisting Dr. Boere as leaders of the course were Prof. Dr. A. G. Brom, Prof. Dr. J. Mulder and Prof. Dr. H. A. Snellen. Participants in the scientific program were Dr. Sheila Anderson (London), Dr. L. A. Boere, Dr. F. H. Bonjer, Dr. B. Bink, Prof. Dr. A. G. Brom, Ir. J. Bekink (Arnhem), Prof. Dr. R. Brinkman (Groningen), Prof. Dr. J. Dankmeijer, Mej. A. Dekker, W. Dekker, Dr. G. E. H. Enderby (London), Dr. W. R. O. Goslings, Dr. J. F. Ph. Hers, H. Labadie (Den Haag), Dr. A. E. Loeliger, Prof. Dr. J. Mulder, Dr. Muller Fz., Dr. J. Niekerk (Amsterdam), Prof. Dr. N. G. M. Orie (Groningen), Dr. J. D. Robertson (Edinburgh), Prof. Dr. H. A. Snellen, H. G. Verdonk, J. Th. Ch. Vonk and Dr. Voorhoeve (Rotterdam).

2 *The question of embolism*

Since we have injected immiscible fluids directly into the portal circulation it might well be suggested that the changes in the liver are due to embolism. Against this view the following arguments may be brought forward

i Similar changes are produced if the poisons are introduced directly into the spleen. Here there must first be absorption into the splenic vein by way of the pulp vessels and it is difficult to understand how droplets large enough to act as emboli could get through into the portal circulation

ii Liquid paraffin when injected into the portal circulation in similar and even in much larger amounts does not produce any change in the liver. Immiscibility is therefore not the important factor

iii If portal blood collected during the introduction of the poison by way of a mesenteric vein is injected directly into the liver of another animal, necrosis of liver cells occurs at once. Here there can be no question of embolism

These observations suggest that the infarction is due either to the action of the poisons on blood vessels in the liver, with complete ischæmia, or to direct action of the poison on the liver cells

3 *The question of non-embolic ischæmia*

Against this are the following arguments

i Histological examination of the affected areas shows that all of the blood vessels and sinusoids are distended with blood long after advanced necrosis has been established. This is not a very good argument, for in the early stages of infarction produced by ligation of the hepatic artery blood fills the distended vessels of the infarct, it is the quality of the blood which matters

ii There is no alteration in the perfusion rate after intra-portal injection of these poisons, despite the presence of extensive liver damage. Thus, with such a liver, the amount of perfusate collected at half-minute intervals differed only slightly or not at all from that collected from the normal organ in similar fashion. This suggests that there is no shutting down of blood vessels in extensive tracts

iii Mottled white areas appear at once in the perfused liver after the portal administration of any one of these poisons. Here there can be no question of exclusion of blood from the affected regions. Obviously the liver cells are directly damaged

There seems little doubt, therefore, that the changes in the liver are due to the direct action of these poisons on the liver cells. Such changes progress uninterruptedly to pale infarction. At first



FOUNDED BY DR. MAX THOREK

The Journal of the International College of Surgeons

FOUNDED IN GENEVA, SWITZERLAND, 1935 - INCORPORATED IN WASHINGTON, D. C., 1940

Vol. XXVII

JUNE, 1957

No. 6

General Surgery

Practical Observations of the Biliary Tract with Operative Cholangiography and Cholografin

MAURICE D. SACHS, M.D., D.A.B.*

CLEVELAND, OHIO

THIS article is offered in emphasis of what can be accomplished with operative cholangiographic study and the intravenous Cholografin.

Operative cholangiographic investigation is invaluable not only in the detection of calculi but in differentiation between pancreatitis and neoplasm, non-calculus obstruction, such as fibrosis of the

sphincter of Oddi, and avoidance of unnecessary surgical intervention. Further, it permits a sound anatomic orientation in secondary operations.

In this technic, as in all new procedures, time and patience are needed to become expert. In addition, there is need for teamwork between the surgeon, the roentgenologist, the technician, the surgical nurse and the anesthetist. Just as more than one or two gastrectomies are needed to qualify a surgeon, so a procedure should not be judged until it has been tried repeatedly to eliminate shortcomings. In most instances these shortcomings are due to lack of experience. The extra time re-

*From the Department of Radiology, Cleveland V. A. Hospital, and Western Reserve University School of Medicine, Cleveland, Ohio.

*Chief, Radiology Service, V. A. Hospital, Cleveland, Ohio; Associate Professor of Radiology, Western Reserve University School of Medicine.

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.

Submitted for publication Sept. 23, 1956.



Fig. 3.—Calculi of common duct (Cholografin). *A*, distal portion of duct obscured by opaque medium in duodenum. Diameter of common duct is normal. *B*, laminogram showing several distinct calculi in distal portion of duct. *C*, operative cholangiogram confirming presence of calculi. Note difference here in diameter of common duct from appearance in intravenous and operative studies.

graphic effect is *ipso facto* an indication of damage to the liver. This is not true. The pyelographic appearance is encountered fairly frequently with no clinical or laboratory evidence of hepatic disease.

Side reactions to Cholografin are less than those observed during an intravenous urographic examination. Reactions can be controlled by a regular slow rate of injection with a stop-watch used as control. The rate should not exceed 5 cc. per minute; if 40 cc. is used, the injection should not be prolonged beyond eight to ten minutes. Of 333 patients examined with the double dose (40 cc.), 30 complained of mild nausea, 21 of nausea and vomiting and 13 of urticaria. Two hundred of this group had undergone cholecystectomy.

Cholografin is demonstrable in the biliary radicles within ten to fifteen minutes after its injection. Obviously, it is impractical to attempt routine visualization of the ductal system and gallbladder every 10 to 15 minutes for two or three hours.

It should be determined in advance,

therefore, whether the emphasis is to be placed on the intrahepatic and common ducts, which are visible with fifteen minutes, with a maximum concentration in the common duct at thirty to forty-five minutes, or on the gallbladder, which appears as an area of thin veil-like density at forty-five minutes with maximum concentration at two to two and one-half hours.

Some pitfalls encountered in interpretation with Cholografin are: (1) stratification of the gallbladder due to failure of bile and dye to mix, with the result that bizarre shadows may be mistakenly interpreted as calculi; (2) air bubbles in the biliary tract after sphincterotomy, misinterpreted as stones; (3) ability of a gallbladder to function, after sphincterotomy; (4) Cholografin in the duodenal bulb or the descending portion of the duodenum, mistaken for a cystic stump; (5) calculi in the distal region of the common duct, obscured by rapid emptying of Cholografin into the duodenum (Fig. 3), and, (6) persistence of

that such a lesion might conveniently be called "toxic infarction" *

The most striking feature is however the strict definition of the lesions. The liver tissue in between appears normal. It might have been expected that some if not most of the poison would have reached the general circulation, so that the whole of the liver would be exposed to the action of the poison until the latter was excreted or destroyed. In that case multiple focal necroses, central or mid-zonal in distribution, should have developed. Since this is not the case we conclude that the liver abstracts a considerable amount of the poison from the circulation at once and the concentration in the blood does not reach a toxic level. The protective action of the liver against many poisons (though not all) is well established (Roger, 1922). Rapid abstraction from the blood stream seems to be responsible. We have noticed that whereas 0.025 c.c. carbon tetrachloride injected directly into the jugular or ear veins of a rabbit is usually fatal at once, more than ten times this amount can be introduced safely by way of the portal circulation.

An alternative suggestion is that the first injection puts out of action large tracts of liver cells, the remaining healthy cells receiving more oxygen and becoming capable even at the centre of the lobules of resisting the circulating poison. That oxygen competition plays some part in determining the localisation of degenerative changes is generally accepted as an explanation of the lesion in passive venous congestion ("nutmeg" liver). But more direct evidence is required before this view can be seriously considered.

Finally there is the question of why certain tracts of liver should be picked out at once by the poison. The idea of a territorial distribution of portal blood has been suggested from the "stream line" experiments of Copher and Dick (1928). Alternatively, and we lean towards this view, there may be variation in function, *i.e.* in abstraction of blood constituents and *pari passu* in the susceptibility of regions of liver cells †. It may well be that the liver is a continually changing mosaic whose pieces vary in function and vulnerability from time to time.

* Laennec (1819) used the term *infarct* for an effusion of fluid or pathological material in tissues. Virchow's investigations (1856) resulted in the name being confined to wedge shaped necroses produced by embolism. Later observations of Cohn (1860), Cohnheim (1872) and Litten (1879) broadened out the concept into one of arterial obstruction with emphasis on the circulation through and around the territory with which the obstructed artery was concerned. Virchow as early as 1847, spoke of *infarction* in the absence of vascular blocking, whilst Welch in his classical account of embolism (1899) describes *infarction* of the lungs, spleen and liver occurring without arterial occlusion.

† Thus also Fliessinger (1908), "*Les cellules hépatiques n'opposent pas toutes la même résistance. Il existe non seulement des zones fragiles, mais encore des cellules fragiles*".

Se describe el diagnóstico colangiográfico de malfuncionamiento del esfínter de Oddi (espasmo ó fibrosis) y pancreatitis.

Se enfatiza el valor práctico de un examen con cholografín, especialmente después de colecistectomía.

Se discute en detalle el diámetro del colédoco normal y el del colédoco después de la operación.

ZUSAMMENFASSUNG

Der Bedarf für operative cholangiographische Untersuchungen und deren praktische routinemässige Ausführung werden erörtert.

Praktisch wichtige Punkte in der Deutung der Röntgenbilder werden hervorgehoben.

Die cholangiographische Diagnose der fehlerhaften Funktion des Sphincter Oddi (von Krampfzuständen bis zur Fibrose) und der Bauchspeicheldrüsenentzündung wird umrissen.

Der Wert der Untersuchung mit Cholografín besonders nach Gallenblasenresektion wird betont.

Auf die Erörterung des Durchmessers des normalen Choledochus und desselben nach Operation wird besonders eingegangen.

SUMARIO

Discute a necessidade a execução prática da colangiografia operatória. Os aspectos praticos de interpretação radiografica são ressaltados. O diagnóstico colangiografico da disfunção do esfínter de Oddi (do espasmo à fibrose) e a pancreatite são motivo de explanação. O A. salienta o valor pratico da Colangiografia com Cholografín especialmente após a colecistectomia. O diametro do coledoco antes e depois da operação merecem comentarios especiais.

BIBLIOGRAPHY

- F. Sachs, M.D., and P. F. Partington, M.D.: Routine Use of Cholangiography. Surg., Gynec. & Obstetrics, 100: 100, 1955.
- Sachs, M. D.: Cholangiography. M. D.: Cholangiography. New York: McGraw-Hill, 1956.
- Sachs, M. D.: Cholangiography: Refresher Course. Read at the Fifty-Fourth Annual Meeting of the American Roentgen Ray Society, Cincinnati, Sept. 24, 1953.
- Sachs, M. D.: Visualization of the Common Duct During Cholecystography; Its Significance, Am. J. Roentgenol., Rad. Therapy and Nuclear Med. 69:745-766, 1953.
- Sachs, M. D., and P. F. Partington, P. F.: Routine Use of Cholangiography. Refresher Course. Read at the Fifty-Fourth Annual Meeting of American Roentgen Ray Society, Washington, D. C., Sept. 21 & 22, 1954.
- Sachs, M. D.: Some Advantages of Operative Cholangiography (Editorial), Arch. Surg. 72:530-532, 1956.
- Sachs, M. D., and Partington, P. F.: Cholangiographic Diagnosis of Pancreatitis, Am. J. Roentgenol., Rad. Therapy and Nuclear Med. 76:32-39, 1956.

I have found that, with some natures, it would pain and perplex their moral anatomy to move direct to an object. Like snakes, they seem formed to take pleasure in indirect motion; with them the true line of moral beauty is a curve.

—Vauvenargues

orchietomy and not to depend on biopsy examination, for fear of spreading cancer cells if this were a malignant tumor. The testicle was removed, with care taken to ligate the cord high up in the inguinal canal. The post-operative course was uneventful.

When examined on Dec. 28, 1956, the patient was in good health; there had been no recurrence.

The pathologic report by Dr. Nathan Rudo revealed the following:

Gross: The specimen consisted of the left testicle, epididymis and part of the spermatic cord enclosed in the tunica vaginalis. It weighed 35 Gm. and measured 5 by 4 by 3 cm. Within the superior portion of the testicle was a firm nodule 1.8 cm. in diameter. On section, the nodule consisted of white laminated caseous material with a peripheral bounding capsule attached at one area to the tunica albuginea. The adjacent testicular tissue appeared normal, and no abnormalities were seen in the rest of the specimen (Fig. 1).

Microscopic: The capsule of the nodule was composed of a thin layer of stratified squamous epithelium resting on a base of fibrous connective tissue. The epithelial cells were flattened and the superficial cells contain keratohyalin granules. Laminated keratin masses rested on the epithelium in the form of thin wavy sheets. No accessory skin structures or teratomatous elements such as cartilage, teeth or glands were found. The testicular tubules showed a moderate degree of spermatogenic activity. There was an increased number of interstitial cells (Fig. 2).

The diagnosis was epidermoid inclusion cyst of the testicle.

Careful routine examination of all men entering the Armed Services, since World War II, has revealed that benign cyst of the testicle may not be quite so rare as formerly believed. Though they may be painful, many of these cysts are asymptomatic and in private practice are usually detected during routine examination or in cases of trauma or acute inflammation of the testicle. Cystic disease may be congenital or may occur after birth. Albert, Frater, and others found a number of these cysts while performing routine autopsies.

When a differential diagnosis is being

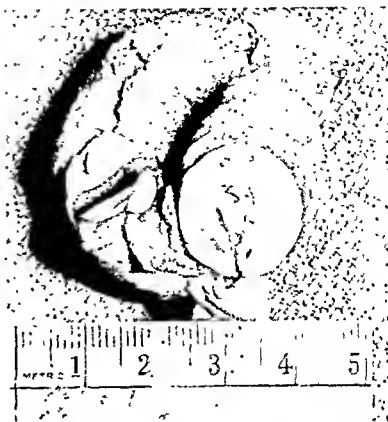


Fig. 1.—Sagittal section of testicle, showing epidermoid inclusion cyst arising from inner surface of its substance, close to tunica albuginea ($\times 1.2$).

made, the presence of a painless, slow-growing, firm, round or ovoid mass in the testicle should lead the physician to suspect benign cyst. The neoplastic tumor grows much faster than the latter type. It should not be confused with encysted hydrocele of the body of the testis, which usually transmits light. Cysts of the tunica albuginea are apt to be smaller, may be multiple, and are situated nearer the periphery of the testis, completely invested with the tunica albuginea. Microscopic study is necessary in order to distinguish these from simple cysts of the substance of the testis.

Gonadotrophic hormone determination is valuable in the diagnosis of many types of neoplastic growths, such as adenocarcinoma, chorio-epithelioma, and certain kinds of seminoma, especially when there is metastasis. However, it is of no use in cystic disease of the testicle, as there is no increase in gonadotrophic hormones nor in certain types of malignant neoplasm, i.e., seminoma without lymphoid stroma (Stevens).

defectives whilst one is said to be normal. Another sister who shows the same clinical syndrome as the patient is at present in Gogarburn Institution. Prior to admission the patient had been resident in Craiglockhart Institution for five years. On admission he was found to be a restless, morbidly irritable and impulsive, feeble minded youth. There was no feature of note on physical examination. He continued to do fairly well, apart from his abnormal irritability, until October 1929, when some weakness and spasticity of the upper extremities became apparent. Examination of the blood and cerebro spinal fluid at this time showed that the Wassermann reaction was negative in both. There was no increase of cells or protein in the cerebro spinal fluid. The muscular weakness and spasticity became more generalised and more marked, until in 1932 he presented the fully developed picture of paralysis agitans.

On 9th September 1932 he developed a polyuria of low specific gravity, which persisted for fourteen days. During that period the average daily excretion of urine was almost 6000 c.c. The urine was clear and almost colourless, and contained neither albumen nor sugar. Its specific gravity was 100¹. This polyuria terminated without treatment. On 1st December 1932 a further attack of polyuria occurred. As this did not cease, treatment by 1 c.c. pituitrin intramuscularly, morning and evening, was commenced. This had no effect and was increased to 3 c.c. daily three weeks later. Although this dose was administered daily for five months there was no appreciable effect on the polyuria. During this period the urinary output was 15,000 c.c. daily. Pituitrin was stopped on 26th May 1933, but there was no further increase in urinary output.

The patient's physical condition gradually deteriorated and he died on 7th May 1936. The diabetes insipidus and the paralysis agitans persisted to the date of his death. An autopsy was performed by Dr Bailey, who found that the cause of death was pulmonary tuberculosis. The kidneys and other organs were normal and the brain and hypophysis were referred intact to this laboratory.

Pathological report External examination of the brain shows no lesions. The meninges are thin and translucent and the large vessels at the base show no atheroma. There may be slight widening of the sulci, but atrophy is not really appreciable. On section there is nothing remarkable. The cortex is of normal width, the basal ganglia show little if any atrophy and no lesions can be detected in the white matter. Pons, medulla, mid-brain and cerebellum show no lesions.

Numerous blocks from the cortex, basal ganglia, hypothalamus, corpus Luysii, red nucleus, pons, medulla and cerebellum were examined. The stains used were hæmatoxylin and eosin, Mallory's phosphotungstic acid hæmatoxylin, van Gieson, Nissl, Cajal's gold sublimate, Cajal's silver nitrate for neurofibrils, Weigert-Pal and Scharlach R. The general stains show a rather diffuse gliosis, most marked in the globus pallidus, thalamus, hypothalamus and region of the red nucleus. It is not intense in the caudate nucleus, putamen, white matter generally nor in the cerebellum. Weigert-Pal preparations show some thinning of the projection fibres from the globus pallidus in the ansa lenticularis, but there is no other

RÉSUMÉ

Il s'agit d'un cas asymptomatique de kyste épidermoïde bénin du testicule gauche chez un homme de 25 ans, guéri par orchectomie.

Il ressort de recherches systématiques récentes que le kyste testiculaire bénin est moins rare qu'on le pense (5% de toutes les tumeurs des testicules). Il faut y songer lorsqu'on se trouve en présence d'une masse tumorale ferme, à croissance lente.

Traitement: orchectomie; dans des cas exceptionnel on pourra se contenter d'une excision locale.

Les tumeurs des testicules devraient toujours être suspectées de malignité. L'orchectomie est indiquée lorsqu'il y a le moindre doute, car il est préférable de pratiquer l'ablation d'un testicule dissémination de cellules malignes.

Nous en sommes encore aux hypothèses quant à l'origine des kystes bènins des testicules; il est probable que divers facteurs étiologiques entrent en ligne de compte.

BIBLIOGRAPHY

- Albert, E.: *Traité de chirurgie clinique et de médecine opératoire*. Paris: G. Steinheil, 1893.
 Arcadi, J. A.: Cysts of tunica albuginea testis. *J. Urol.* 68:631, 1952.
 Barach, A. L.: Report of a case of cyst of the

testicle in a dog. *Proc. New York Path. Soc.* 19: 38, 1919.

Bland-Sutton, J.: *Tumours innocent and malignant*. London: Cassell, 1922.

Cook, F. E., Jr., and Kimbrough, J. C.: Epidermoid cysts of the testicle. *J. Urol.* 72:2-236, 1954.

Cooper, A.: *Observations on the structure and diseases of the testis*. Ed. 2. Philadelphia: Lea & Blanchard, 1845.

Curling, T. B.: *Observations on cystic disease of the testicle*. *Med.-Chir. Trans.* London 36: 22-449, 1853.

Dockerty, M. D., and Priestley, J. T.: *Dermoid Cysts*. *J. Urol.* 48:392, 1942.

Ewing, J.: *Teratoma testis and its derivatives*, *Surg. Gynec. & Obst.* 12:230, 1911.

Frazer, K.: Cysts of the tunica albuginea (cysts of the testis). *J. Urol.* 21:135, 1929.

Hochenegg, J.: *Ueber cysten am Hoden und Nebenhoden*. *Wien. med. Jahrb.* 15:149, 1885.

Jenkins, R. H., and Deming, C. L.: Cysts of the testicle. *New England J. Med.* 213:57, 1935.

Johnson, S.: Benign tumors; case. *U.S. Navy M. Bull.* 48:893, 1948.

Muir, I.: Benign cystic teratoma (dermoid cyst). *Brit. J. Surg.* 40:144 (Sept.) 1952.

Olsen, J. G., and Calderin, V. O.: Epidermoid cyst of the testis. *United States Air Force M. J.* 6:747, 1955.

Pirot, R., and Moncourier, L.: Benign embryoma of right testicle with generalized malignant metastases (case). *Bull. Assoc. France, p. l'étude du cancer* 26:338, 1937.

Rose, W., and Carless, A.: *Manual of Surgery*. Ed. 11. New York: William Wood & Company, 1924.

Smith, C. K.: Large cystic testicle and epididymis. *Urol. & Cutan. Rev.* 23:393, 1919.

Verneuil: *Arch. gén. méd.* 5me. Série 5:641, 21: 299, 1855.

Wilms, M.: Die teratoiden geschwulste des hoden mit einschluß der sogenannten cystoid und enchondrome. *Beitr. z. path. Anat. u. z. allg. Path.* 19:233-366, 1896.

The discovery that man can be scientifically manipulated, and that governments can turn large masses this way or that as they choose, is one of the causes of our misfortunes. There is as much difference between a collection of mentally free citizens and a community molded by modern methods of propaganda as there is between a heap of raw materials and a battleship. Education, which was at first made universal in order that all might be able to read and write, has been found capable of serving quite other purposes.

bone A small piece was taken for biopsy This showed a profuse mono nuclear infiltration of the ulcerated corium, but there was nothing distinctive about the histological picture and no definite diagnosis could be made The Wassermann reaction, which was subsequently done, was negative

The patient was given a course of X-ray treatment, after which he began to complain of excessive thirst and excessive secretion of urine It was found that he was passing from 6 to 10 litres daily of a urine of low specific gravity, which contained neither albumen nor sugar At the onset of the polyuria, pituitrin, 0.5 c.c. thrice daily, was effective in controlling the urinary output

The patient was subsequently transferred to the medical wards because of his diabetes insipidus It was then found that pituitrin had lost its efficacy and that the patient continued to pass from 6 to 10 litres of urine of low specific gravity in spite of the injection of 3 c.c. daily The patient, therefore, showed a diabetes insipidus which for two months was controlled by pituitrin, but which subsequently became refractory to this treatment and so continued until his death four months later

Professor Cappell kindly sent the brain and hypophysis to this laboratory

Pathological report There is no atheroma of the basal vessels The meninges, except over the floor of the third ventricle, are thin and translucent When the somewhat thickened meninges over the hypothalamus are elevated a yellowish swelling is noted anterior to the corpora mamillaria and posterior to the tuber cinereum This is the only lesion seen on external examination of the brain The hypophyseal stalk is perhaps a little reduced in size

On section the only lesion found is in the hypothalamus (fig. 2) Here a soft yellowish mass is seen extending from the posterior margin of the optic chiasm to the anterior border of the corpora mamillaria The tuber cinereum is completely replaced

Sections from the cortex, basal ganglia, pons, medulla and cerebellum show no lesions, apart from a slight amount of pallidal siderosis On serial section of the hypothalamus the mass already noted is found to have a symmetrical distribution, extending laterally almost to the optic tracts Histologically the lesion consists of a large number of compound granular corpuscles emmeshed in a variable amount of stroma This is composed of proliferating and somewhat swollen astrocytes, but there is also some fibroblastic proliferation and collagen formation especially in the vicinity of the meninges In parts a few polymorphs are found, and many of these have been phagocytosed by the reacting histiocytes Towards the margins of the lesion the vessels are surrounded by a cuff of mononuclear cells Scattered here and there are small areas of recent necrosis and polymorph invasion The histological findings, therefore, support the diagnosis of an inflammatory softening The inflammation is progressive, but evidently of indolent character—healing and extension occurring side by side without any diffuse infection of the subarachnoid

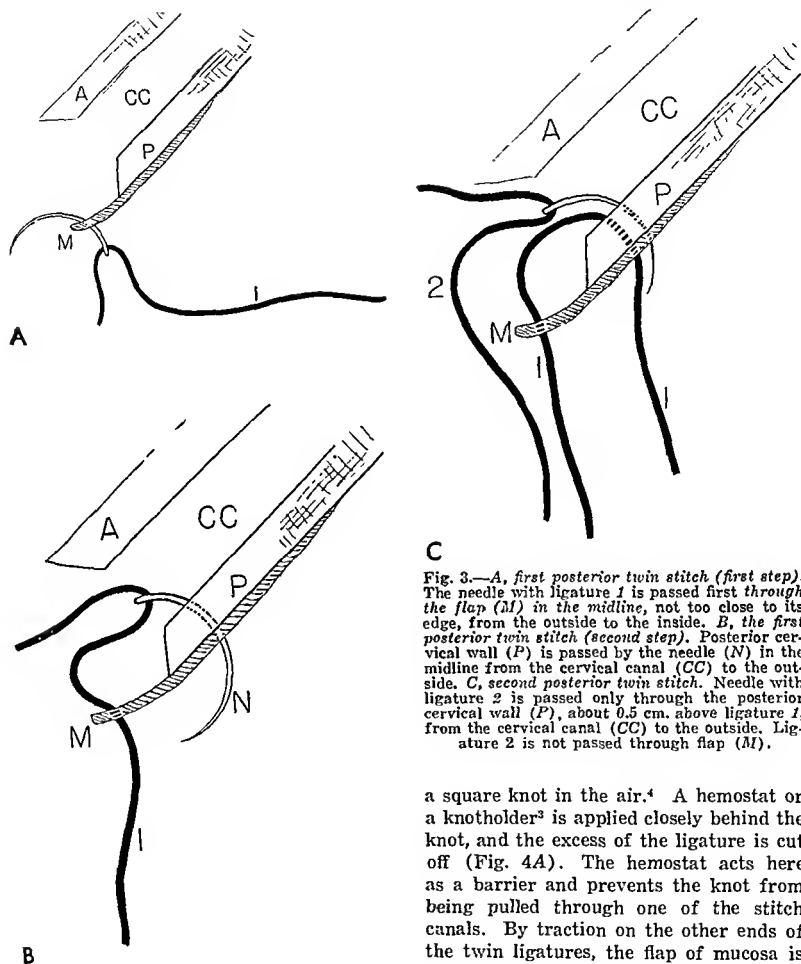


Fig. 3.—A, first posterior twin stitch (first step). The needle with ligature 1 is passed first through the flap (M) in the midline, not too close to its edge, from the outside to the inside. B, the first posterior twin stitch (second step). Posterior cervical wall (P) is passed by the needle (N) in the midline from the cervical canal (CC) to the outside. C, second posterior twin stitch. Needle with ligature 2 is passed only through the posterior cervical wall (P), about 0.5 cm. above ligature 1, from the cervical canal (CC) to the outside. Ligature 2 is not passed through flap (M).

flap of the mucosa.

The posterior set is tied first. The ends of the ligatures at the flap are united by

a square knot in the air.⁴ A hemostat or a knotholder³ is applied closely behind the knot, and the excess of the ligature is cut off (Fig. 4A). The hemostat acts here as a barrier and prevents the knot from being pulled through one of the stitch canals. By traction on the other ends of the twin ligatures, the flap of mucosa is pulled into the cervical canal (Fig. 4A). The assistant supports this maneuver with the previously attached hemostat behind the knot. Thus the tension is considerably reduced and the danger of

L'application de points doubles implique les modifications suivantes:

1. Ils sont fixés sur la ligne médiane.
2. Le second point ne passe ni antérieurement ni postérieurement à travers le lambeau muqueux. Ainsi, la ligature doit passer par le bord du lambeau, et le contact entre la muqueuse inversée et la paroi cervicale est amélioré.

3. Le premier des deux points passe à travers le lambeau muqueux qui est le plus éloigné du bord.

Le "rail" cervical, instrument précieux pour les opérations sur le col, qui conduit l'aiguille et protège les tissus, est également décrit.

ZUSAMMENFASSUNG

Es wird über eine neue Art von Zugnähten (T1 und T2), die die folgenden Funktionen erfüllen, berichtet:

1. Sie gestatten eine ausgezeichnete Exponierung des Gebärmutterhalses.

2. Sie immobilisieren den Gebärmutterhals und schalten den Gebrauch verletzender Instrumente aus.

3. Sie gestatten einen sauberen Verschluss der Schleimhaut nach der Umstülpung.

4. Sie dienen als zusätzliches Hilfsmittel zur Blutstillung.

Die Verwendung von Doppelnähten erfordert folgende Modifizierungen:

1. Sie werden in der Mittellinie angelegt.

2. Die zweite Naht wird weder vorn noch hinten durch den Schleimhautlappen hindurchgeführt. Infolgedessen muss die Ligatur durch den Rand des Lappens hindurchgehen, und der Kontakt zwischen der eingestülpten Schleimhaut und der Wand des Gebärmutterhalses wird verbessert.

3. Die erste der beiden Nähte wird weiter vom Rande entfernt durch den Schleimhautlappen hindurchgeführt.

Ferner wird ein bei Operationen am Gebärmutterhals nützliches Instrument, die Kollumschiene, beschrieben, die den Weg der Nadel leitet und das Gewebe schützt.

RIASSUNTO

Vengono presentati nuovi metodi di trazione (T1 e T2) che hanno i seguenti vantaggi:

1. Realizzano una eccellente esposizione della cervice.

2. Immobilizzano la cervice ed eliminano l'impiego di strumenti traumatizzanti.

3. Consentono una perfetta chiusura della mucosa.

4. Hanno una funzione emostatica.

La applicazione di due punti comporta:

1. La loro applicazione sulla linea mediana.

2. Il secondo punto non passa attraverso la mucosa nè anteriormente nè posteriormente.

3. La prima coppia di punti passa attraverso il lembo di mucosa lontano dall'orlo.

Viene infine descritto uno strumento molto utile per gli interventi sulla cervice, che serve di guida all'ago e protegge i tessuti.

RESUMEN

Se presentan unas nuevas suturas de tracción (T1 y T2), que tienen las siguientes funciones:

1. Dan excelente exposición del cervix.

2. Inmovilizan el cervix y evitan el uso de instrumentos traumatizantes.

3. Permiten un cierre perfecto de la mucosa después de la inversión.

4. Función hemostática adicional.

La aplicación de las suturas gemelas incluye las siguientes modificaciones:

1. Se colocan en la línea svedia.

2. La segunda sutura no se pasa a través del colgajo de mucosa ni anterior ni pos-

quite exsanguinated. If a patient has missed a menstrual period, even by a few days, this is often a cue; one of the simpler methods of early diagnosis of ruptured ectopic pregnancy is a cul-de-sac puncture revealing blood that does not coagulate normally. In probably 80 to 90 per cent of the cases the patient has missed a menstrual period. There is probably the beginning of a flow, or at least a show of blood. Some of the pain is frequently of value in ectopic rupture due to the blood irritating the peritoneal cavity about the diaphragm, etc.

Ovarian neoplasms do not always produce early pain, but if a solid tumor is present it should be regarded as possibly a malignant tumor.

In evaluating the pain which is complained of by individuals we should not overlook the so-called traumatic abdominopelvic pain. A certain number of patients will come into this category, but certainly they should not be so classified until all possible forms of pathologic change have been ruled out.

Relief from certain types of pelvic pain can be obtained by sympathectomy and the intraspinal injection of alcohol. The intractable pain associated with carcinoma of the uterus, particularly the cervix, is relieved by such procedures. Pelvic sympathectomy, or removal of a part of the sympathetic nerve plexus, known as the presacral nerve or the superior hypogastric plexus, is not a serious operation. The intraspinal injection of alcohol is used on occasion by some neurosurgeons and has proved valuable.

Guerriero and Stuart did an elaborate piece of work on "checking out" the chief complaints of 5,539 patients who were admitted to the hospital under their observation with the chief complaint of pelvic pain. There were 1,371 cases in which the pain was of gynecic origin or simulating gynecic pain. Five hundred and seventy-

one, or 41.6 per cent, of these women actually had pelvic pain of other than gynecic origin, and 800, or 58.4 per cent, had gynecic states to explain the origin of their pain. Guerriero and Stuart stated that only 10.6 per cent of these women required major operations for the relief of pain. They recommend that, unless an acute state requires it, operation can be deferred until the cause of the pain has been determined.

The management of severe dysmenorrhea and pelvic pain is as much a problem now as it was in 1852, when Marion Sims stated in his handbook on gynecology: "Of all the newly found drugs, not any is of much value to the woman with severe cramps, except laudanum." In 1921 Leriche made a complete study of the pelvic sympathetic system in its relation to pelvic pain. He developed periarterial sympathectomy of the internal iliac arteries. In 1925 Cotte noted that the same results could be obtained by resection of the superior hypogastric plexus. Cotte called the superior hypogastric plexus the presacral nerve.

The pain of cervicitis, the pain of labor in its first stage and the retrombilical (not umbilical) pain of appendicitis are pure visceral pains, deep-seated, ill localized and with no somatic component.

Rupture of the corpus luteum may present a clinical picture essentially similar to that of a ruptured follicle, except that the time of onset of menstruation is different. Many women with acute bilateral pelvic pain do not have pelvic inflammatory disease, at least not in an acute inflammatory stage.

Pelvic cellulitis is observed most frequently during the puerperium; it often occurs, however, in nonpregnant patients after uterine or cervical instrumentation.

Intraperitoneal rupture of a tubo-ovarian abscess is a major catastrophe. The patient may or may not have been known

show a marked difference from those seen in a case of diabetes insipidus secondary to the disappearance of the supraoptic nuclei (Biggart, 1936), in which there was a very appreciable degree of atrophy of the pars tuberalis, stalk and pars nervosa

Case 2 is of even greater value in the localisation of the damage responsible for the failure of the antidiuretic factor to control the polyuria. The fact that at the onset pituitrin had a very definite action seems to indicate that at this time the lesion was confined to the supraoptic-hypophyseal system. Certainly the histological findings in the other cases which were successfully controlled by this hormone would support this idea. The subsequent failure of pituitrin appears to be due to one of two factors: (a) the possible development of an anti-hormone, or (b) the extension of the lesion to involve some nervous centre, the integrity of which is necessary before the antidiuretic hormone can affect the polyuria. Now it has never been shown that an antihormone is manufactured against pituitrin, and the successful treatment of many cases of diabetes insipidus over long periods militates against the acceptance of this idea. Souques, Alajouanine, and Lermoyez (1922) gave 500 injections to one patient, always with the same success. Hence the extension of the lesion to some neighbouring nervous centre seems to be the anatomical basis for the change in this patient's reaction to the hormone.

In the following table and in fig. 3 the anatomical lesions in seven cases of diabetes insipidus are summarised.

TABLE
Human diabetes insipidus

Site of injury	Case						
	1	2.	3	4	5	6	7
Supraoptic hypophyseal tract	+	+	+	+	+	—	+
Nucleus supraopticus	—	—	+	—	+	sl	+
Pars tuberalis	+	+	—	+	—	—	sl
Pars nervosa	+	+	—	+	—	—	sl
Nuclei of tuber cinereum	—	—	+	—	—	+	+
Reaction to pituitrin	+	+	—	+	+	—	—

sl = slight involvement

It becomes apparent that there is a distinct difference between those cases in which pituitrin is successful and those in which it fails. The three cases in which pituitrin had no effect show in common a lesion of the tuberal nuclei, whilst these nuclei have escaped in the four cases in which pituitrin controlled the polyuria.

might better be described as somatogenic or psychogenic. In the development of a psychosomatic disorder there are three requisites: (1) a psychoneurotic predisposition, (2) an exciting emotional conflict and (3) restriction of outward expression of the conflict.

It should not be overlooked that pain is a symptom common to all parts of the body. The genital tract is, of course, no exception. It is estimated that pelvic pain accounts for at least 35 per cent of the admissions to a gynecologic ward. The urologic system or phase should not be overlooked by anyone at any time in diagnosing obscure pains in the pelvis or the lower part of the abdomen, especially if the complaint is chronic.

Pain, as Mengert has classified it, might be categorized as follows:

Pain of genital origin

1. Pain due to gonorrhea, pelvic inflammatory disease, pelvic cellulitis or hemorrhage.

2. Pain due to uterine prolapse, adhesions, twisted pedicle of ovarian cyst

3. Pain due to periodic distention of an endometrial implant

4. Pain caused by tumor incarcerated in the pelvis

5. Pain accompanied with rupture of uterus, tube or bladder.

Pain of extragenital origin

1. Pain originating in pelvic neurosis

2. Pain originating in other pelvic structures: (a) bony, sacroiliac; (b) urinary tract, or (c) intestinal tract: colitis, diverticulitis, appendicitis.

Hemorrhage from a ruptured follicle, a cyst of the corpus luteus or ovulation may at times be confusing. Chronic pelvic pain is often the result of pathologic change in the cervix. Deep-seated dyspareunia is frequently due to a chronic disease of the cervix. Uterine prolapse of the second or third degree can cause pain by producing the dragging-down sensation. A retrodis-

placed uterus is not looked upon as a cause of pelvic pain nearly as often as it formerly was.

There is grossly little clinical or pathologic similarity between adenomyosis and the large "chocolate cyst" of the ovary.

An idea commonly accepted by the laity is that pelvic pain indicates disease of the female organs. The majority of women seen by the gynecologist seek medical attention because of pain low in the abdomen or the back. The investigation of pelvic pain, therefore, may be time-consuming and expensive, but the patient still merits a detailed survey before an exploratory operative procedure or any nonindicated drug therapy is employed. The gynecologic diseases causing pelvic pain might be listed as: (1) cervicitis and parametritis; (2) uterine enlargement; (3) pelvic endometriosis; (4) malposition of the uterus; (5) pelvic congestion, and (6) adnexal disease. Cervicitis is manifested by erosion, hypertrophy, eversion, cystic change and laceration. Enlargement of the uterus causes backache and abdominal pain because of pelvic congestion due to the stretching of supportive ligaments, due in turn to the increased size of the uterus.

Endometriosis of the pelvic viscera has a high place among gynecologic causes of pelvic pain. Gynecologists are becoming more keenly aware of this condition, and the diagnosis is much more frequently made in recent years than it formerly was.

The presence of tender cul-de-sac nodules, a retroverted, tender uterus and fixed adnexae in a patient who complains of backache, pain in the lower part of the abdomen, dysmenorrhea and dyspareunia offers strong evidence that endometriosis is present. Uterine malposition, particularly prolapse, is a frequent cause of low abdominal pain and backache. Taylor amplified the concept of pelvic congestion as a cause of pelvic pain and a "congestion fibrosis"

show a marked difference from those seen in a case of diabetes insipidus secondary to the disappearance of the supraoptic nuclei (Biggart, 1936), in which there was a very appreciable degree of atrophy of the pars tuberalis, stalk and pars nervosa

Case 2 is of even greater value in the localisation of the damage responsible for the failure of the antidiuretic factor to control the polyuria. The fact that at the onset pituitrin had a very definite action seems to indicate that at this time the lesion was confined to the supraoptic-hypophyseal system. Certainly the histological findings in the other cases which were successfully controlled by this hormone would support this idea. The subsequent failure of pituitrin appears to be due to one of two factors (a) the possible development of an anti-hormone, or (b) the extension of the lesion to involve some nervous centre, the integrity of which is necessary before the antidiuretic hormone can affect the polyuria. Now it has never been shown that an antihormone is manufactured against pituitrin, and the successful treatment of many cases of diabetes insipidus over long periods militates against the acceptance of this idea. Souques, Alajouanine, and Lermoyez (1922) gave 500 injections to one patient, always with the same success. Hence the extension of the lesion to some neighbouring nervous centre seems to be the anatomical basis for the change in this patient's reaction to the hormone.

In the following table and in fig. 3 the anatomical lesions in seven cases of diabetes insipidus are summarised

TABLE
Human diabetes insipidus

Site of injury	Case						
	1	2	3	4	5	6	7
Supraoptic hypophyseal tract	+	+	+	+	+	—	+
Nucleus supraopticus	—	—	+	—	+	sl	+
Pars tuberalis	+	+	—	+	—	—	sl
Pars nervosa	+	+	—	+	—	—	sl
Nuclei of tuber cinereum	—	—	+	—	—	+	+
Reaction to pituitrin	+	+	—	+	+	—	—

sl = slight involvement

It becomes apparent that there is a distinct difference between those cases in which pituitrin is successful and those in which it fails. The three cases in which pituitrin had no effect show in common a lesion of the tuberal nuclei, whilst these nuclei have escaped in the four cases in which pituitrin controlled the polyuria.

Primary Carcinoma of the Fallopian Tube

Report of a Case

J. MARK COX, M.D., F.I.C.S., D.A.B.

WASHINGTON, D.C.

THE rarity of primary carcinoma of the fallopian tube prompts this report. This is one of the rarest of all malignant diseases. Only a few over 500 cases have been reported in the literature¹ up to the time of writing. The diagnosis is seldom made before operation.² A greater familiarity with this subject on the part of more surgeons is desirable, because this lesion is one of the most malignant of body cancers.³

Incidence.—The reported incidence varies between 0.31 per cent and 0.5 per cent of female pelvic malignant tumors.⁴ In one controlled series of 12 cases, it was as low as 0.16 per cent. The lesion has been observed in patients from 17 to 80 years of age. About three-fourths of the patients in the cases reported were past the menopause and were nulliparous. Wechsler reported that two-thirds of his patients were between 40 and 45 years of age, and Hu stated that most of his were between 40 and 65.^{4a} Raynaud is given credit by some authors for recording the original case in 1847. By others, the credit is given to Orthman (1886) for the first description.^{4a}

Pathologic Picture.—The pathologic picture was first described by Rokitansky in 1861.⁵ In the cases reported the tumor has been adenocarcinoma.^{1b} It arises in the mucous membrane and shows a papillary pattern. It usually causes the formation of a hydrosalpinx, and the symptoms are those of inflammation of the fallopian tube.^{1a} Spread may take place by lym-

phatics, blood stream, direct extension and peritoneal implantation. It is similar to the spread of ovarian malignant neoplasms and often involves the retroperitoneal route to the presacral nodes.⁶ The carcinoma is often not discovered until the tube is opened. The lesion is usually in the distal two-thirds of the tube and often is associated with tuberculosis in the tube.^{1a} In a few cases it has been diagnosed by Papanicolaou smear before operation.⁷

Prognosis.—In about 25 per cent of cases recurrence has taken place in one year.^{1a} Survival rates have been discouraging; less than 4 per cent of the patients were reported to have survived for three years.^{1a} Haupt reported only 6 survivals among 321 patients in eight years.^{1a}

Symptoms.—Authors agree that pain is an early symptom. The pain may be sharp and intermittent or persistent and dull. It is usually located in the region of the affected tube and in the back.⁴ Occasionally it is referred to the bladder or the rectum or radiates down the leg.⁸

A mass is usually palpable in the pelvis or the abdomen, and the lesion may be confused with salpingitis, ovarian cyst, myoma of the uterus or ectopic pregnancy.⁹ Occasionally the mass may disappear or become smaller after a vaginal discharge.^{4a} Vaginal discharge of some kind is usually present and may vary from leukorrhea to bleeding. Any serous or serosanguinous discharge from the cervix should cause s ee lesi

From the Hadley Memorial Hospital, Washington, D. C.
Submitted for publication Jan. 31, 1957.

series of cases of human diabetes insipidus resistant to the action of pituitrin in which the lesion was definitely localised to any particular nucleus. The mere demonstration of a hypothalamic in contradistinction to a hypophyseal lesion is in general considered sufficient. However, it appears worth recording that in the majority of resistant cases the aetiology is commonly syphilitic basal meningitis or epidemic encephalitis, both of them disease processes which tend to produce a rather diffuse lesion of the hypothalamus. All cases of diabetes insipidus secondary to epidemic encephalitis are not, however, resistant to pituitrin, so that it would seem that both types of diabetes insipidus can be produced by this disease process and that it is a question of which nuclei are involved. Fradiss (1926) has collected 74 cases of human diabetes insipidus, of which 12 were resistant to pituitrin. In three cases following the failure of this hormone antisiphilitic treatment was successful. Nine cases, several of which were associated with acromegaly, were unaffected by any treatment. Cases following epidemic encephalitis in which pituitrin was without effect have also been recorded by Hall (1923), Snell and Rowntree (1927), Leschke (1933) and Biggart (1935). The case reported by Babonneix and Lhermitte (1925) is of interest in view of the suggestions embodied in this paper. In a woman aged 42 years with diabetes insipidus and a strongly positive Wassermann, these authors report that the pars anterior, pars intermedia and pars nervosa of the hypophysis were normal. The meninges covering the hypothalamus were thickened and infiltrated by plasma cells and lymphocytes. The anterior aspect of the tuber cinereum was normal. The nucleus paraventricularis, nucleus suprachiasmatus and nucleus supraopticus were also considered normal, but the "nuclei propres" of the tuber cinereum were atrophic, "*des cellules réduites de taille et dans lesquelles toute formation cytoplasmique a disparu*".

A case somewhat similar to case 2 of the present paper is recorded by Stringer (1934). A white male aet 27 years suffered from diabetes insipidus for five months before his death. The polyuria was at first effectively controlled by pituitrin, but gradually this drug lost its effect and the degree of polyuria was scarcely affected by its administration. At autopsy a pinealoma with a "seeded" metastasis in the region of the tuber cinereum was found. This metastasis was found to have destroyed the tuberal group of hypothalamic nuclei and to have invaded the pituitary stalk. It therefore not only interrupted the supraoptic hypophyseal system, but also destroyed the nuclei of the tuber cinereum itself.

All the available evidence, therefore, would seem to support the idea that in the presence of the syndrome of diabetes insipidus, a lesion of the nuclei of the tuber cinereum leads to the development of a resistance to the action of the antidiuretic factor. This idea

Ophthalmologic Surgery

The Beta Applicator as an Ophthalmic Therapeutic Tool^{*}

FRED M. WILSON, M.D.

INDIANAPOLIS, INDIANA

IN order to consider beta radiation as a therapeutic tool, one must first understand something of its mode of action. The following facts are pertinent:

To be effective, radiation must be absorbed by tissue, not just pass through. High energy radiations, therefore, pass through the anterior segment of the eye with too little absorption to be therapeutically effective, but beta particles from radium, radium D, radon and radioactive strontium penetrate only superficially and are absorbed by the tissues of the anterior segment.

This absorption releases energy in each tissue cell involved, causing damage by ionization, especially in the nucleus, to a degree that varies with the dose. This damage can result in cellular death either from an overwhelming single dose or from cumulative effects. Damaging effects from smaller doses, however, may permit tissue recovery, but, reversible or not, the effect of radiation is always to damage, if not to destroy.

Indications.—*Pterygium* is the most common indication for beta therapy, and both the primary and recurrent forms are

treated the same way. Beta radiation is used postoperatively rather than as the only treatment. This not only reduces the dosage considerably but improves the cosmetic result. The usual procedure is to resect the pterygium, leaving a large bare area of sclera, which is then partially closed along a horizontal line by mobilizing the conjunctiva. A bare scleral crescent remains near the limbus, however, and it is here that the postoperative irradiation is applied, causing subsequently a tight, avascular scar, across which recurrence is rare. As a rule, this requires two beta treatments, one about five days after the operation and again in three or four weeks, especially if there is a tendency to some limbal vascularization at some particular point during this time.

Beta radiation alone can be used to stop the progression of pterygium, reducing it to a dense, inactive scar. This scar is white, however, and not cosmetically satisfactory. For this reason and because considerably more radiation is needed to effect this change than to prevent recurrence after operation, beta irradiation is not recommended as an exclusive and primary treatment of pterygium, but should be used postoperatively.

Chronic inflammatory tumor or excess granulation tissue also can be treated by beta therapy. These ocular lesions are usually treated by surgical means.

From the Department of Ophthalmology, Indiana University Medical Center.

Read at the Twenty-First Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.

*This study was supported by Grants-in-Aid from the National Society for the Prevention of Blindness, Inc., and Better Vision Fund, Indiana University.

Submitted for publication Jan. 2, 1957.

REFERENCES

- BABONNEIX, L , AND LHERMITTE, *Ann Méd* , 1925, \viii 471
J
- BIGGART, J H *Brain*, 1935, lviii 86
- " *Edinb Med J* , 1936, \liii 417
- ELMER, A W , KEDZIERSKI, J , *Wien klin Wschr* , 1928, \li 591
AND SCHEPS, M
- FRADISS, L *Le diabète insipide, Paris*, 1926
- HALL, G W *Amer J Med Sci* , 1923, clxv 551
- HUNT, J R *Brain*, 1917, xl 58
- " *Arch Neur Psych* , 1933, xxv 1332
- INGRAM, W R , FISHER, C , AND *Arch Int Med* , 1936, lvi 1067
RANSON, S W
- LESCHKE, E *Ann Méd* , 1933, xxxiii 261
- SNELL, A M , AND ROWNTREE, *Endocrinology*, 1927, \i 209
L G
- SOUQUES, ALAJOUANINE, AND *Rev Neur* , 1922, \xlii 766
LERMOYEZ, J
- STRINGER, S W *Yale J Biol Med* , 1933 34, vi 375

by the additional variable of applicator dose rate. It is true that beta applicators are calibrated by the manufacturer, but a fluctuating M.I.D. from one applicator to another would seem to indicate inaccuracies in the methods of calibration used in the past (Table 1).

The physical measurement of beta radiation has been a complex, difficult problem, ' for clinical purposes the need is for constancy of calibration rather than absolute accuracy. Table 1 indicates a definite trend toward a more nearly constant M.I.D. among some of the more recent strontium applicators. This is encouraging, and it may mean that physical methods of calibration will prove consistent enough to be clinically dependable. There is too much at stake, however, to accept this trend as fact until it is firmly

established, especially since physical calibration has been unreliable clinically in the past, and biologic standardization of each new applicator has proved to be an adequate safeguard in dosage calculations prior to its use on human eyes.

Complications.—In beta-irradiated ocular tissues, late changes, such as telangiectasis and keratinization of the conjunctival epithelium, atrophy of the sclera, keratitis, corneal scarring and thinning, iritis, iris atrophy, and radiation cataract have been discussed by several authors.² Except for conjunctival telangiectasis, which I have seen following 6,000 rep, but which can occur in some persons after dosages under 5,000 rep,^{2c} and also except for lens changes, to be discussed presently, the complications of beta radiation are the result of dosages that are frequent-

TABLE 2.—*Clinical Indication and Dosages in Terms of Minimum Inflammatory Dose (M.I.D.).*

Condition	Average Total Dosage		Comment
	M.I.D. Dosage Factor	Example for Applicator with M.I.D. of 20,000 REP.	
Benign neoplasms	0.15 M.I.D.	3,000 REP.	2-4 fractions after excised to base
Carcinoma, basal, squamous	0.20	4,000	Preliminary, superficial, subtotal irradiation in single fraction
Carcinoma, Bowen's	0.30	6,000	4-8 fractions for early, thin lesion, or excised to base
Chronic inflammatory tumor	0.10	2,000	Small, single fractions guided by response
Granulation tissue	0.10	2,000	One or two treatments
Phlyctenulosis	0.03	600	Only for most persistent lesions
Plaque, epithelial	0.25	5,000	Excised to base with 2-3 fractions postoperatively
Pterygium	0.15	3,000	Treat at 5 days and 30 days after operation
Scleritis	0.05	1,000	Treat symptoms only
Trichiasis	0.08	1,600	Epilation dose about equal to S.E.D.
Corneal ulcer	0.025	500	Better for more chronic types; use proximal spray technic
Vascularization, corneal	0.25	5,000	Superficial types only
Vernal conjunctivitis	0.09	1,800	Treat

onl

be granular and under a magnification of 3000 or 4000 diameters were seen to consist of minute faintly stained red granules, in fact they looked like very faintly stained eosinophil cells (figs 2 and 3)

(c) Among other objects of interest found in nearly all the films were small, round or oval, or pyriform rings measuring about $\frac{1}{2}$ -1 μ in diameter, which generally stained a faint red with Giemsa. They were ill defined and only faintly coloured, and at times had a deeply stained red spot at one end. They were not unlike minute piroplasma bodies. They occurred singly or in groups, or arranged in lines, and were easily overlooked. Levaditi and colleagues (1932) think that the virus of rabies is a microsporidion (*Glugea lyssae*) and possibly these bodies are a stage in the life history of that parasite.

In films of the salivary glands of infected rabbits blue bodies were commonly found. They were round, oval or irregular in shape and varied from $\frac{1}{2}$ to 5 μ in diameter, some stained dark blue, others very light blue. In some instances they could be resolved into 5 or 6 small round bodies which are probably allied to those just mentioned.

(d) *Intravascular bodies in the brain and cord* In the course of my search I found 3 or 4 blue-stained bodies in a small blood vessel in two films of the brain of a rabbit infected with fixed virus (figs 9, 10 and 11). Their appearance and particularly their position put out any thought of their being merely accidental. Lt-Col Covell at my request sent me in February some films of the brain of a dog infected with street virus but in these I found nothing new. In April he kindly sent 15 smears and 6 multiple impression films of the brain of a monkey inoculated with street virus and in the small vessels of these preparations were a very large number of these intravascular bodies precisely like the very few I had found in the rabbit (figs 1, 4 to 8, and 12). They were usually round or oval, rarely irregular in shape, and generally stained blue. They varied in size, the majority being about $\frac{1}{2}$ -1 μ in diameter, but larger forms are also met with, some reaching 5 or even 6 μ . Smaller forms are also found, measuring only 0.3-0.4 μ . The great majority showed no structure, but in some a spot was seen situated in the centre or at one side and this was deeper and darker in colour but still blue or reddish blue. These bodies were usually single, sometimes double like a diplococcus, or more rarely in threes arranged in the form of a triad, but never were they in the form of a chain. In the diplococcal forms, one element might be much smaller and more deeply stained than the other. Many were surrounded by an unstained halo. The largest forms were often somewhat lobulated and these on higher magnification were seen to consist of 10-12 very small bodies which had run together, or they might represent division forms. Some of the smaller reddish

Ocular Tendon Transplantation: Indications, Variations and Technic

WILLIAM E. KREWSON III, M.D., F.A.C.S., F.I.C.S.

PHILADELPHIA, PENNSYLVANIA

BY operating on the extraocular muscles it is possible to create either of two effects; that is, to weaken or strengthen the mechanical purchase exerted by the muscles upon the globe. Weakening (or lengthening) procedures are: (1) tenotomy, (2) myotomy, (3) myectomy and (4) recession. Strengthening (or shortening) procedures are: (1) advancement, (2) tuck, (3) resection, (4) cinch and (5) transplantation.

Attention is herewith directed to the transplantation of ocular muscles. It is a method not commonly used and is regarded unfavorably by many surgeons. The fact that its use has proved disappointing in some cases is probably due to the fact that the procedure has definite limitations; when these are exceeded, poor results are inevitable. More important, perhaps, are the indications for its use, which must be observed rigidly.

Strictly speaking, surgical transplantation is not a strengthening procedure, but rather a substitution for the function of a paretic muscle accomplished by altering the direction of action of one or more other muscles. More specifically, the insertion, and also the point of contact, of a nonparalyzed muscle may be used so that the resulting effect will compensate for the action of the paralyzed muscle.

Transplantation has taken many forms and has been applied to all manner of

oculomotor disturbances. It has many advocates, but there are those who hold it in disdain. The fact that the method has been tried mostly in problem cases, probably in desperation, has contributed to this disparagement. The term is usually applied to various forms of substitution in the surgical treatment of paralysis of the lateral rectus muscle.

Operation for Paralysis of the Lateral Rectus Muscle.—Acquired abducens paralysis is characterized by convergent deviation, limitation of abduction and homonymous diplopia, which eventually may give way to suppression. In cases of long-standing paralysis, contraction of the antagonistic medial rectus muscle may develop, as well as a tendency to turn the head toward the affected side. Spontaneous recovery will occur in some cases, and therefore, before surgical intervention is considered, a reasonable period—six to twelve months—should be permitted for observation, especially if the origin of the paralysis is traumatic. When no improvement occurs during this interval, operation is indicated.

The object of surgical intervention, of course, is to establish parallelism of the visual axes in the primary position. If this result can be obtained and normal retinal correspondence is present, binocular single vision in this position is to be expected. When long-standing suppression has been established and then suddenly abolished by operation, however, diplopia of a most annoying type may result. Also, when contraction of the

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.

Submitted for publication Sept. 17, 1956.

tion (Fig. 4) as was done in this case. It is important when one reattaches the split portions of the tendon to have these flattened out so as to provide as wide an attachment as possible, with minimal retraction, and this may be accomplished better by the use of two separate sutures (Figs. 2, 3 and 4). Most writers state that the temporal portion of the superior rectus is transplanted to or beneath the point of insertion of the lateral rectus; but in my experience, in order to reach this point the muscle has to be put on a tremendous stretch, and for this reason I have been in the habit of attaching it just above the insertion of the lateral rectus.

The same procedure is performed on the inferior rectus muscle. Baldwin⁷ has suggested attaching the inferior tendon transplant slightly closer to the lateral rectus insertion than the superior tendon is inserted, in order to improve downward gaze, and I have found this helpful.

It is important not to split the tendon more than 10 mm. back from its detached end. The effective point of the new insertion, as was pointed out by Francois,⁶ is at the point of division of the two portions of the tendon; hence, the shorter the split, the more lateral and the more anterior is this new and effective insertion.

Final adjustment, if satisfactory abduction is not obtained, is effected by further recession or by marginal myotomy of the medial rectus. McLean⁸ suggested detaching the medial rectus, identifying it with loose sutures and reattaching it as necessary several days after the transplantation operation.

Complications.—The complications of transplantation are few. Most notable is a rather prolonged postoperative reaction. Occasionally slight enophthalmos has been noted, with accompanying narrowing of the palpebral fissure, but this usually does not last for more than a few days after

the operation. Temporary changes in the corneal astigmatism and folds in Descemet's membrane, apparently due to pressure of the muscles on the globe, have been reported also. Not infrequently a vertical muscle imbalance of small degree is produced; it can usually be overcome by means of vertical prisms incorporated in spectacle frames, as was necessary in the case presented.

COMMENT

The mechanism by which the operation accomplishes its purpose has been the subject of much debate. Spaeth² expressed the opinion that recession of the medial

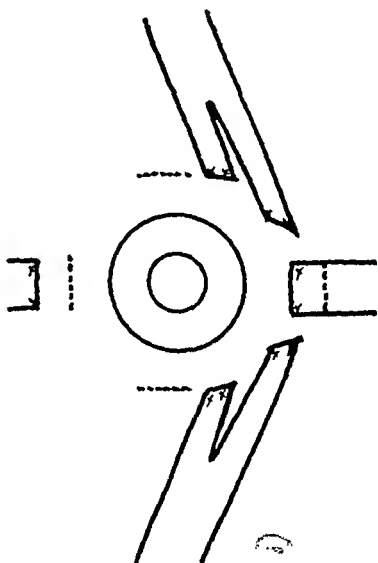


Fig. 4.—Left eye. Author's m
plantation of "inf" and inf
medial an
la

and Palfrey (1922) state that "typhus is a disease of the smaller blood vessels, and we have demonstrated that the parasite of the disease localises almost exclusively in the vascular endothelium" Cowdry (1925 *a* and *b*), in heart-water, a febrile disease affecting sheep, goats and cattle in South Africa, has shown that the *Rickettsia ruminantium* are restricted to the endothelial cells of the small blood vessels, where they occur in large densely packed masses, mostly in the renal glomeruli and in the capillaries of the brain

In both these diseases the *Rickettsia* are in the endothelial cells, not only of the brain but of other organs, and it is possible that in rabies also the bodies here described may be present in organs other than the brain and cord. I have examined the submaxillary glands of two rabbits infected with fixed virus and of one with street virus, as well as the kidneys and adrenals of a rabbit infected with fixed virus in which very numerous bodies were present in the brain, but so far with negative results. The films of the salivary glands contained, however, exceedingly few small blood vessels.

In films of the brain and cord of two guinea-pigs infected with the rabies-like disease of Trinidad described by Hurst and Pawan (1931, 1932), kindly sent me from the Ministry of Agriculture, I found typical Negri bodies but I could detect no evidence of the intra-endothelial bodies in the blood vessels. In smears from the brain of one of two rabbits infected with the Trinidad disease intravascular bodies similar to those seen in true rabies were, however, fairly numerous.

Although the great majority of the bodies I have described are too large, in this stage at least, to pass the ordinary filters, some of them are quite small enough to do so. The larger bodies also showed signs of inner bodies and it may be that these are filterable. The microscopical appearances accord well with the exhaustive filtration experiments made by Glusmann and his colleagues (1930).

Summary

In rabies, the endothelial cells of small blood vessels in the brain contain small stainable particles which have the appearance of being parasites.

I would take this opportunity of expressing my sincere thanks to those who have so kindly provided me with material—Dr C. van Rooyen of Edinburgh University, Lt Col G. Covell, I.M.S., director of the Pasteur Institute, Kasauli, Dr P. Lepine, in charge of the rabies department, Pasteur Institute, Paris, Dr W. H. Andrews and Mr J. M. Penhale of the Ministry of Agriculture and especially Dr W. M. Scott of the Ministry of Health for numerous specimens over a long period.

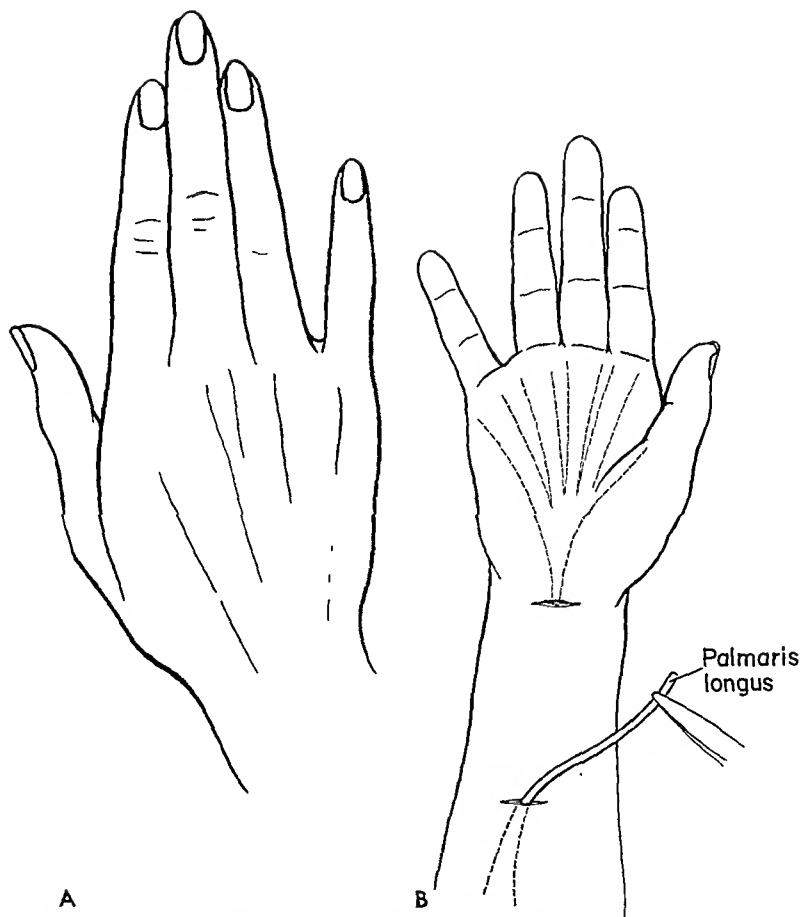


Fig. 1.—A, loss of ability to adduct the small finger or the ring finger; accentuated with digits held in extension. B, division and preparation of the palmaris longus tendon for a "free tendon graft."

tourniquet had been placed above the upper portion of the right arm. A small C-shaped incision was made over the right palm in the region of the distal palmar crease. Below the

skin, scar tissue, the injury, was encountered

netrating
as ex-
erve
ve

In the seventeenth and eighteenth centuries, Willis of England, Duverney of France and Valsalva of Italy are but a few to whom we owe so much. It was during this period that some of the earliest surgical procedures for relief of deafness were described. Paracentesis of the tympanic membrane was employed for the relief of deafness long before it was advised as a means of facilitating drainage of the middle ear. Similarly, mastoidectomy was recommended as a cure for deafness and tinnitus long before it was accepted in the treatment of mastoiditis.

The nineteenth century brought with it certain refinements in otologic knowledge. Corti emphasized histologic study and was the first to describe the cochlea in detail. It was during this period that the French, German and English schools of otolaryngology contributed so many of the great names that have become bywords. Among these must be mentioned Helmholtz, Weber, Rinne, Yearsley, Toynbee, Wilde and Politzer.

Modern Concepts of the Surgical Treatment of Deafness.—The successes attained in present-day operations for deafness are due not only to the otolaryngologic tradition of knowledge and experience but to the many advances in modern science. Refinements in audiologic testing provide greater accuracy in choosing candidates for surgical treatment; new technics in roentgenography make possible the visualization of anatomic regions and pathologic entities heretofore not recognized; the use of the magnifying loupe and the operating microscope enables the surgeon to devise technical procedures never before possible; modern chemotherapeutic agents and antibiotics help immensely in the successful completion of operations that were formerly defeated by secondary infection.

Deafness in general can be divided into four main categories: nerve deafness;

conduction deafness and a combination of the two, known as mixed deafness and central deafness. Nerve deafness involves the neural elements of hearing and may occur in the end organ of hearing, in the nerve pathways to the brain or in centers in the brain itself. The deafness that occasionally follows mumps or meningitis is an example of the pure nerve type of deafness. By contrast, the hearing loss of patients with otosclerosis is a result of impairment of the sound-conducting mechanism alone and is therefore classified as conduction deafness. It is not uncommon for nerve deafness to coexist in a patient with conduction deafness (the so-called mixed deafness). This is illustrated by the patient with conduction deafness due to chronic disease of the middle ear in whom further hearing loss results from damage to the auditory nerves associated with aging. Central deafness occurs as a result of injury, disease or maldevelopment in the auditory centers of the brain itself. The clinical result is inability to perceive and recognize sound in a normal manner despite the fact that audiometric responses are apparently normal.

Accurate diagnosis of the type of deafness present is extremely important, since surgical treatment is employed only for those patients in whom disturbance of the sound-conducting mechanism is the sole or major cause of the hearing loss. At the time of writing, no known surgical procedure can restore or improve hearing in a patient with nerve deafness or central deafness. For such a patient a properly fitted hearing aid of the right type, instruction in lip reading and auditory training can do much to ameliorate the affliction.

Among the disease : ..ducing
conduction deafness ..
treatment are (1 ..
tissue ..
(2) ..

Methods

In series (A) a no. 0 needle attached to a hypodermic syringe containing 2 c.c. glucose broth or physiological saline was inserted obliquely through the bowel wall. The contents of the syringe were then expressed into the lumen and mixed with the intestinal contents by gentle massage and as much as possible withdrawn. The pH of the saline extract was estimated by means of a B.D.H. capillator. Thereafter the fluid was divided into four equal portions, the first was inoculated into 10 c.c. of one per cent glucose broth, the second was plated on agar, the third on MacConkey's medium, while the fourth was centrifuged and films were stained by Gram's method. The solid cultures were examined after 48 hours' incubation.

In the autopsy series (groups B, C and D) material was obtained by puncturing the seared surface of the bowel and sometimes of the gall bladder and spleen. Cultures were made from the contents of the first part of the duodenum, the first part of the jejunum and the middle and lower third of the ileum. The material thus obtained was plated on agar and on MacConkey's medium, and occasionally also cultured anaerobically, films were made from each specimen and the pH at all levels was estimated in a number of the cases.

Relation of site to organisms isolated

Operation series (A) Of 50 specimens of gastro-intestinal contents examined, 28 were taken from various levels between the body of the stomach and the mid-ileum, 18 from the last two feet of the ileum and 4 from the caecum. Only 2 of the first mentioned (one from body of stomach and another from mid-ileum) yielded a coliform growth—*B. lactis aerogenes* (table I). Coliform cultures were obtained in 6 of the 18 specimens from the last two feet of the ileum. Further at this level anaerobic bacilli of the *B. welchii* type were recovered for the first time always in association with coliform strains. As all the children in this series were over one year of age and consequently on a mixed diet, aciduric organisms (*B. acidophilus* and *B. bifidus*) were scanty, both in films and cultures of the intestinal contents. Of the other organisms found in these cases streptococci, all of the *acidilactici* type, were isolated from the upper jejunum and mid-ileum in 40 and 30 per cent respectively, while enterococci were obtained from the lower ileum in 12 per cent. *Staphylococcus aureus* was never isolated. In the remaining 4 cases culture of the caecal contents resulted in a mixed growth of coliform bacilli, enterococci and *B. welchii*.

It would appear from these observations that in children with uncomplicated inflammation of the appendix the effects remain localised to this organ and a normal scanty bacterial flora is present in the stomach and small bowel, coliform bacilli being almost entirely absent except in the terminal ileum. A corresponding relative sterility of the duodenum and jejunum was found in a small autopsy series of dysentery cases in which the lesion was

ian tube is present, however, surgical treatment of the associated atresia of the auditory canal does not improve the hearing.

Surgical correction of atresia of the auditory canal is designed to create a new auditory canal, but, because of the coexistent deformities in the middle ear, the hearing improvement brought about by this procedure alone often fails to bring the hearing up to a serviceable level.

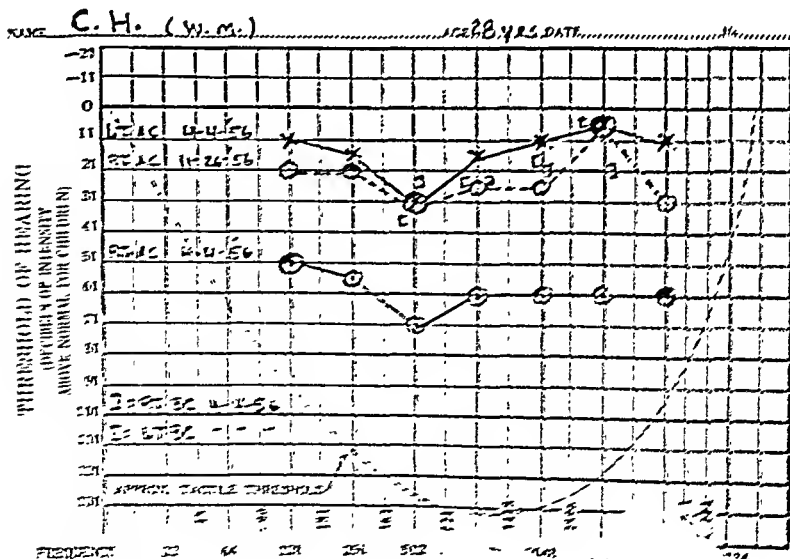
With the addition of fenestration, performed at the same time the new auditory canal is created or later (two-stage technic), hearing levels well within serviceable range can frequently be obtained.

Because of the hazard of injury to the facial nerve in this type of operation, it is advisable that the operation be performed only when the congenital defect is bilat-

eral.

Noncongenital bony atresia of the auditory canal is relatively infrequent. In some instances the cause is unknown; in others the condition is an aftermath of trauma. When it occurs bilaterally, the impediment in hearing may be severe. Removal of the obstructing bony growth permits the return of normal hearing (Fig. 2).

4. *Surgical Treatment of Deafness Caused by Otosclerosis.*—The present-day treatment of deafness caused by otosclerosis forms one of the brightest chapters in the entire history of otolaryngology. Although this curious and baffling disease has long been known to otolaryngologists, it is only within the past twenty-five years that operation for deafness has been successful. The following passage is translated from the writings of Valsalva, re-



Thus the coliform incidence at the various levels in the non-septic group (B) may be regarded as essentially normal for the autopsy series and may serve as a basis for comparison with the septic (C) and gastro-enteritis (D) groups. Of the 42 subjects in the former, the majority had some diffuse parenteral infection and the incidence of coliform bacilli at certain levels of the bowel was higher than at corresponding sites in the non-septic group (B), but lower than in the gastro-enteritis group (D). This increase of coliforms in group (C) may be due to the fact that in approximately two-thirds of the patients with parenteral infection slight secondary acute enteritis was present. This septic series comprised 23 cases of primary bronchopneumonia and 19 of septicæmia, in both of which organisms other than coliforms, *e.g.* *Staphylococcus aureus* and streptococcus, were more abundant in the upper levels of the small bowel than in any of the other autopsy groups. In the lower levels these organisms were usually absent or very scanty. In the bronchopneumonic cases the strains most frequently found in the upper coils were *Staphylococcus aureus* (18.1 per cent) and *Streptococcus salivarius* and *viridans* (18.8 per cent), from the same levels in the staphylococcal septicæmias the causal organism was isolated in 62.5 per cent, in the pneumococcal and hæmolytic streptococcal septicæmias the infecting strains were not recovered from the intestine. The route by which the causal organism reaches the intestine in septicæmic states, whether direct or *via* the bile, is being further investigated and will be reported later.

In the 46 cases of acute primary gastro-enteritis the coliform percentage in the upper coils of small bowel was very high—87.0 per cent in the duodenum and 90.0 per cent in the upper jejunum. Davison also found that coliforms were absent from the duodenal contents of normal infants, but were abundant in 84 per cent of those with diarrhœa. No other types of organism were isolated from these levels. In these 46 cases (group D) as well as in a further series of 20 gastro-enteritis cases in which cultures were made from the bowel mucosa, we failed to find any particular coliform strain common to the whole group and absent from the other cases without enteritis. The strains most frequently isolated were roughly of 6 types according to their fermentative reactions, *viz.* *B. coli communis*, *B. lactis aerogenes*, MacConkey's bacillus no. 71, *B. proteus*, *B. paracolon*, and more rarely, Morgan's bacillus no. 1. Though some of these have been described as the ætiological agent in gastro-enteritis, we are unable to confirm this, since similar organisms occurred with almost equal frequency in the other groups studied, and furthermore we have repeatedly isolated the above strains from the faeces of healthy children with no history of recent gastro-enteritis, as have Logan (1913-14), Sisson (1918) and Kahn (1935). We have likewise failed to find

auditivo; d) otosclerose com anilose do estapédio.

3. O tratamento cirúrgico, utilizado para aliviar a surdez inclui: a) excisão do teci-do linfóide; b) mastoidectomia conserva-dora ou radical com enxertos de pele; c) nos doentes com atresia formação de neo-canal auditivo); d) fenestração; e) mo-bilização do estribo.

REFERENCES

1. Stevenson, R. S., and Guthrie, D.: A History

of Otolaryngology. Baltimore: The Williams and Wilkins Company, 1949.

2. Juers, A. L.: Preservation of Hearing in Sur-gery for Chronic Ear Disease, *Laryngoscope* 64: 235-251 (April) 1954.

3. Wullstein, H.: Theory and Practice of Tym-panoplasty, *Laryngoscope* 66:1076 (Aug.) 1956.

4. Lempert, J.: Improvement of Hearing in Otosclerosis—A New One-Stage Surgical Tech-nique, *Arch. Otolaryng.* 28:42, 1938.

5. Rosen, S.: Palpation of Stapes for Fixation, *Arch. Otolaryng.* 56:610-615 (Dec.) 1952.

6. Symposium: The Operation for the Mobiliza-tion of the Stapes in Otosclerotic Deafness, *Laryngoscope* 66:729-784, 1956.

IMPORTANT NOTICE TO ALL PARTICIPANTS IN CONGRESSES AND REGIONAL MEETINGS

Those desiring their Congress presentations to appear later as articles in the Journal of the International College of Surgeons, please note:

1. A full copy of the manuscript, together with all illustrations, legends, tabular matter and bibliographic references, should be sent DIRECT to the Editorial Office, Journal of the International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois. Manuscripts so submitted will be promptly acknowledged and, on acceptance by the Editorial Board, published as soon after the Congress as possible. The Journal cannot be held responsible for loss, failure of acknowledgment, delay in publication or nonpublication of any manuscript, or any subsidiary material appertaining thereto, which has not been submitted through the official editorial channels.

2. Manuscripts may be submitted in advance of the Congress if desired. When this is done, they should be plainly marked with the name, place and date of the Congress or Meeting concerned, to guard against premature publication.

3. Manuscripts delivered in person to Congress officials or others for press reportorial use only should be sent by the recipient to the Public Relations Bureau.

4. If illustrations are desired and it is impossible to submit them at the time the manuscript is submitted, the notation "Illustrations to come" should accompany the latter; otherwise the article may be scheduled for publication before the illustrations have arrived.

These requests are made not only to safeguard the Journal from error but in the best interests of our contributors. To make sure of prompt acknowledgment and efficient handling of your Congress presentation, please send it DIRECT to its ultimate destination!

*Relation of age to the incidence of coliform bacilli
in the small bowel*

In the operation group (A) all the children were over one year of age and in the gastro-enteritis group (D) all except 3 were under this age. It was thus impossible to judge if the age factor had any effect on the coliform incidence in the small bowel in these groups. Such a comparison was possible, however, in the non-septic (B) and septic (C) groups, as both comprised children over and under one year, a period when the diet is still largely composed of milk in some form. The change to a more solid and more varied diet after the first year may cause some alteration in the intestinal flora and the comparison for subjects under and over one year of age is shown in table II. As only a very small proportion of infants

TABLE II

*The incidence of coliform bacilli in different types of cases at various levels
of the gastro intestinal tract, etc. in children under and over one year of age*

Type of case	Non septic (B)				Septic (C)				Gastro-enteritis (D)		
Site	Under 1 year		Over 1 year		Under 1 year		Over 1 year		Under 1 year		
	Cases	Coliforms	Cases	Coliforms	Cases	Coliforms	Cases	Coliforms	Cases	Coliforms	
Duodenum	17	6 35 3	19	5 26 3	26	18 69 2	16	7 43 8	47	40 93 1	
Upper jejunum	17	7 41 2	19	6 31 6	25	19 76 0	16	8 50 0	39	35 89 8	
Mid ileum	17	11 64 7	19	12 63 2	25	23 92 0	16	14 87 5	40	37 92 5	
Lower ileum	17	15 88 2	17	14 82 4	24	23 95 8	15	14 93 3	41	41 100 0	
Bile	16	0	16	0	25	0	16	0	35	5 14 3	
Spleen	4	0	7	0	11	0	5	0	8	3 37 5	

Percentages in heavy type

in these groups had been wholly breast-fed it was not possible to determine what effect the different types of feeding had on the intestinal flora. In the non-septic group (B) and the septic group (C) respectively the incidence of coliform bacilli was somewhat higher in infants than in older children, while the incidence at all bowel levels for children under one year was found to be greater in the gastro-enteritis group (D) and septic group (C) than in the non-septic group (B).

The high incidence of coliform organisms in infants may depend partly on the readiness with which the fluid intestinal contents are regurgitated during the irregular peristalsis common to this age, the ascent of coliform bacilli from the lower coils thus being mechanically brought about. The relative shortness of the infantile as compared with the adult intestine may further facilitate ascent. Coliform bacilli may also reach the duodenum in food, e.g. milk,

Proctologic Surgery

Further Experiences with Hyaluronidase in Anorectal Surgery

HENRY C. SCHNEIDER, M.D., F.A.C.S., F.I.C.S.

PHILADELPHIA, PENNSYLVANIA

LOCAL anesthesia by perianal infiltration of procaine is probably the safest for surgical treatment of the lower part of the rectum and the anus. Except for an occasional patient who is elderly or a poor risk, however, this method has not been widely used for routine anorectal procedures because of a number of deterrents, principally (1) inadequacy and insufficient duration of anesthesia, (2) distortion of the tissues at the site of injection, (3) exquisite pain caused by the injection until the anesthetic takes effect and (4) increased risk of infection. It appeared, therefore, that some method to facilitate diffusion of the anesthetic solution in the subcutaneous tissues was necessary, not only to increase the efficiency of the local analgesia but to obviate the other undesirable factors that have limited the popularity of local anesthesia for proctologic operations.

Since 1942, when Consentino¹ and Duran-Reynals² first suggested the addition of hyaluronidase to local anesthetic solutions, a great deal has been learned about the pharmacologic properties and clinical uses of the substance.

The principal advantage of the use of hyaluronidase as an adjunct to local anesthesia is that the enzyme hydrolyzes hya-

luronic acid ("ground substance" present in the interstices of the tissues), thus promoting rapid diffusion of the anesthetic solution. The rate of spread is proportionate to the amount of the enzyme used, and the extent is proportionate to the volume of the fluid injected.

Obviously, it is necessary to add a vasopressor to the hyaluronidase-anesthetic mixture; otherwise the solution would continue to spread, and the duration of anesthesia would be shortened.

During the past four years I have performed routine anorectal operations with the area under anesthesia, using hyaluronidase* with 1 per cent procaine. Various vasopressor drugs were employed in the anesthetic-hyaluronidase mixture; 3,4-dihydroxynorephedrine** in 5 cc. ampules of 0.1 per cent solution was found most satisfactory. (This is a local vasoconstrictor that produces less general increase in blood pressure than do other and similar compounds.)

A preliminary series of 357 patients, operated upon with local infiltration anesthesia, was described in November 1954.³ I have continued to use the same technic routinely in my practice, and now at the time of writing, four years after initiating the method, the series totals 1,200 anorec-

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1955.

Submitted for publication Sept. 19, 1956.

*Hyaluronidase is available as WYDASE (lyophilized stabilized solution) from Wynt. Unit is equivalent to the T.

**Cobefrin (Winthrop-St

for the middle and 6.2 to 7.3 for the lower (van der Reis, 1925) Arnold (1926, 1933), in various investigations on healthy dogs, found a duodenal pH of 5.5 to 6.5, the maintenance of which depended on a normal gastric secretion

TABLE III

The pH at various levels of the gastro intestinal tract etc., in different types of cases

Site	Operation cases (A)	Post-mortem series	
		Non-enteritis (B and C)	Enteritis (D)
Stomach { Body Pylorus	3.5 4.6		
Duodenum		6.61 (4.6-7.4)	7.16 (4.6-8.0)
Upper jejunum	6.55 (5.9-7.3)	6.76 (4.6-7.8)	7.36 (5.8-8.0)
Mid ileum	6.8 (6.2-7.4)	7.06 (6.1-8.4)	7.38 (5.1-8.2)
Lower ileum	6.9 (6.2-8.0)	6.96 (5.6-8.7)	7.36 (6.0-8.2)
Bile		6.99 (6.0-7.4)	7.33 (6.4-7.8)

The extremes of pH are in parenthesis

The reaction at the various levels in our operation series (A) corresponds closely with that observed in the non-enteritis post-mortem series (groups B and C combined). On the other hand, the pH of the different parts of the intestine in the primary enteritis group appeared to be slightly less acid. This may be the result of exudation of alkaline tissue fluid into the lumen from the inflamed intestinal wall.

In this investigation the incidence of coliform organisms bore no relationship to the pH at the various levels, this was to be expected when one considers that the coliform group, while preferring a slightly acid medium, can flourish within a fairly wide range of pH, being inhibited only at 4.6 to 5.0 on the acid side and 9.2 to 9.6 on the alkaline side (Shohl and Janney, 1917). These limits were rarely reached in our cases. It would thus appear that pH within the range of the normal bowel contents is not by itself the decisive factor in regulating the coliform incidence in the small intestine.

The presence of bacteriophage in the small bowel

Since, as we have shown, the reaction of the upper intestinal contents was not sufficiently acid to inhibit coliform growth, some other factor must account for the relative sterility. It was thought that the explanation might be forthcoming in the presence of a bacteriophage localised to the upper part of the small bowel and

cuatro años con infiltración local inducida con una mezcla de procaína, hialmo midasa y un vasopresor (3,4-dihidroxinorefedrina). Cada componente es de particular importancia para la anestesia local en cirugía proctológica.

Las características ventajosas del método incluyen: 1) técnica simple y fácil; 2) analgesia inmediata y relajación de esfínteres y tejidos perianales; 3) poca ó ninguna distorsión de tejidos; 4) reducción notoria de edema perianal; 5) mas fácil identificación de planos de clivaje; 6) casi ausencia absoluta de hemorragia capilar durante la operación; 7) reducción de orina retenida; 8) ausencia de efectos indeseables; y 9) menor hospitalización después de operaciones anorrectales.

En la opinión del autor este tipo de anestesia es superior a cualquier otro para la mayoría de los procedimientos quirúrgicos en la parte inferior del recto y del ano y es preferida por los pacientes, muchos de los cuales temen los métodos que exigen anestesia espinal.

RÉSUMÉ

Un grand nombre d'opérations anorectales ont été pratiquées durant une période de quatre ans, en utilisant des infiltrations locales d'un mélange de procaine, de hyaluronidase et d'un vaso-constricteur (3,4-dihydroxynoréphédrine). Dans cette composition chaque produit présente un avantage bien défini pour l'anesthésie locale dans ce genre d'opération.

La méthode présente les avantages suivants: 1) technique simple et facile; 2) analgésie immédiate, relâchement du sphincter et des tissus péri-anaux; 3) absence de distortion tissulaire, ou distortion minime; 4) nette diminution de l'œdème péri-anal; 5) meilleure séparation des plans de clivage; 6) suppression presque complète, durant l'opération, de l'hémorragie capillaire; 7) diminution de la réten-

tion urinaire; 8) absence de complications fâcheuses; 9) raccourcissement du temps d'hospitalisation.

Selon l'auteur, ce mode d'anesthésie est supérieur à tout autre pour la majorité des interventions portant sur la partie inférieure du rectum et sur l'anus; il est apprécié des malades, dont beaucoup appréhendent une anesthésie rachidienne.

RIASSUNTO

Negli ultimi 4 anni sono state eseguite numerose operazioni ano-retali in anestesia locale ottenuta con una miscela di novocaina, ialuronidasi e un vasocostrittore (la 3,4-diidrossinorefedrina). In questa miscela ogni componente si dimostra particolarmente favorevole all'anestesia per la chirurgia proctologica.

Fra i vantaggi si devono annoverare (1) la facilità e la semplicità della tecnica; (2) l'analgesia immediata e il rilasciamento dello sfintere e dei tessuti perianali; (3) lo scompaginamento modesto o minimo; (4) la riduzione dell'edema perianale; (5) una soddisfacente delimitazione dei piani di clivaggio; (6) una pressoché completa cessazione del sanguinamento capillare; (7) una riduzione della ritenzione urinaria; (8) la mancanza di effetti collaterali spiacevoli e infine una diminuzione del periodo di ospedalizzazione post-operatoria.

Questo tipo di anestesia è superiore ad ogni altro, secondo l'autore, per la maggior parte degli interventi sul retto distale e sull'ano, ed è anche preferito dai pazienti molti dei quali temono l'anestesia spinale.

ZUSAMMENFASSUNG

In einem Zeitraum von vier Jahren ist eine grosse Anzahl von anorektalen Operationen mit örtlicher Infiltration einer Mischung von Novocain, Hyaluronidase

a flora tends to appear in the small intestine which in many respects quantitatively and qualitatively resembles that of the large bowel, while Arnold (1926 and 1930), and Arnold and Brody (1926) showed that coliforms tend to migrate upwards from lower bowel levels whenever the contents of the upper coils become alkaline. While in our series the pH of the latter was generally slightly acid the degree of acidity was not of itself sufficient to prevent the growth of coliform strains which can flourish through a fairly wide range of pH . No constant relationship was noted by us between the pH of the intestinal contents and the presence or absence of coliform growth in a consecutive series of 50 autopsy cases where the pH was determined at all bowel levels. Davison also found that pH had no obvious effect on the duodenal flora and considered that it was not a factor in the sterilisation of the duodenal contents. Further, as demonstrated by Teale (1934) the normal succus entericus of animals possesses no germicidal action. On the other hand, Montgomery *et al* (1931) found that some, but not all, varieties of yeast were killed by mixtures of human bile and pancreatic juice.

Another possible explanation of the freedom from coliform organisms of the upper coils of the small bowel is bacteriolysis due to a coliform bacteriophage, as found by Klenberger (1928) in animal and by Kanzler (1932) in human duodenal contents. Our work does not confirm the findings of these authors, as filtrates of the duodenal and jejunal contents were invariably inert towards numerous coliform strains isolated from lower bowel levels. Suppression of coliform bacilli by the aciduric flora so abundant in the lower bowel of the normal breast-fed infant was not a factor in the present investigation, since the great majority of infants in all our autopsy series had been artificially fed.

Other causes have been suggested, *e.g.* that the secretion from the healthy pyloric antrum has bactericidal properties (Henning, 1931) or that bacteriostatic power resides in the normal duodenal mucosa (Arnold, 1926, 1933). Mechanical factors, too, may be partly responsible, the normal rapid emptying of the small bowel leaving no pabulum for any coliform bacilli gaining accidental entrance to this region. Thus it would seem both from our own work and from that of others that many factors in addition to gastric acidity play a part in keeping the small intestine relatively sterile.

(2) *Primary acute gastro-enteritis*

In this disease it is apparent both from our findings and from those recorded in the literature that, apart from outbreaks of gastro-enteritis associated with food poisoning and due to such organisms as *Staphylococcus aureus*, *B. welchii*, *B. enteritidis* etc.,

The night before operation a colon irrigation is given until clear fluid is returned.

The abdomen is entered by an incision approximately from the xiphoid to the umbilicus, and the abdomen is explored for metastatic carcinoma. The cecum and the right half of the colon are then mobilized, and the ileocolic and right colic arteries are occluded with bulldog clamps, care being taken to place the clamp proximal to anastomosing vessels. The ileum and the transverse portion of the colon are cleared at the point where division is to take place, and a rubber-shod clamp is placed across each to prevent bleeding through the bowel wall or the immediately adjacent vessels. If there is good circulation after fifteen minutes the right colic and ileocolic arteries are divided near

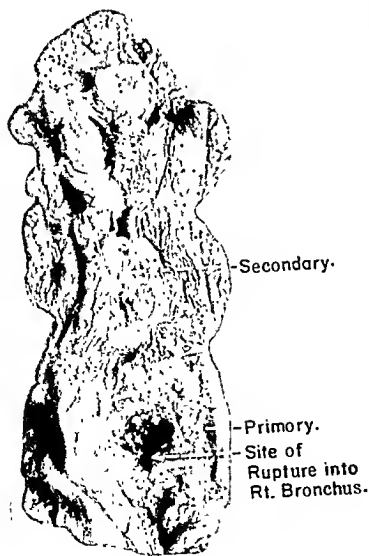


Fig. 1

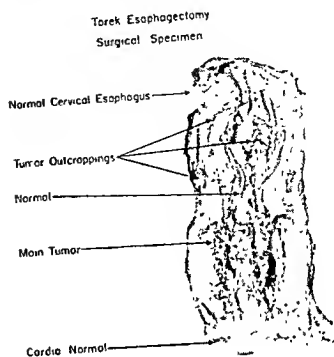


Fig. 2

their point of origin and the ileum is transected. During the waiting period an appendectomy is performed.

The substernal tunnel is now prepared and the retrosternal space entered from above by a collar incision in the neck and from below by an incision of the sternal origin of the diaphragm at the xiphoid. The tunnel is then made by blunt dissection, largely with the finger and hand or with gauze dissectors. When the tunnel is adequate a catheter is passed downward through it, the ileal sutures fixed to it and the terminal portion of the ileum and colon drawn up into the neck. Care is taken to prevent twisting the blood vessels and tearing the mesenteric vessels by too much stretching. In my opinion it is important not to tear the pleura and have the colon lie in the free pleural space, since redundant loops could easily become caught, distended, obstructed or even gangrenous.

The esophageal stump is mobilized and the ends freshened. If sufficient length is available, the ileum is removed and an esophagocecostomy is performed. If length is lacking and

viable,

ascent to the normally empty duodenum and jejunum of the lower intestinal contents with their coliform flora. Imperfectly digested food present in the small bowel constitutes a rich nutrient medium for coliform bacilli. According to Marriott (1931) the mere fact of overfeeding favours the ascent of coliforms to the duodenum, since the latter never empties completely and accordingly the bowel contents form a continuous culture tube. That ascent of coliform bacilli is secondary to a disordered state of the stomach and upper coils of small bowel would appear to receive confirmation from our results in cases of disease localised to the lower intestinal tract, *e.g.* appendicitis and dysenteric ileo-colitis. Coliform bacilli in the upper coils of small intestine were practically absent in the former disease and scanty in the latter.

While the sequence of events just described, *viz.* the primary digestive disturbance resulting from deficient gastric and intestinal secretion accompanied by irregular peristalsis, explains the majority of cases of gastro-enteritis, one must still account for those small epidemics of apparently infective origin which occur in children's institutions with a clean milk supply. We have investigated several such outbreaks, but have never succeeded in incriminating any one coliform type and it seems to us that the infective agent in these cases may be an ordinary coliform bacillus, the virulence of which has become exalted by growth in an unusual situation, *viz.* the small bowel. Kleinschmidt as a result of his investigation made a similar suggestion and Dufourt proved experimentally that coliform bacilli isolated from cases of infantile diarrhoea were more virulent for guinea-pigs than those from healthy children. The abnormal and highly toxic conditions resulting in the small bowel in acute gastro-enteritis are responsible for the visceral lesions already described. Damage to the liver—the organ generally showing the most advanced pathological change—may be due to toxic substances in the portal blood as suggested by Boyd (1923) on rather meagre data. Bacterial invasion of the tissues is infrequent, the intestinal mucosa forming an almost impenetrable barrier except in cases of marked intestinal inflammation or ulceration, when occasionally in young infants actual coliform septicæmia and meningitis may result.

In over 90 per cent of our gastro-enteritis cases purulent exudate, sometimes yielding a coliform growth, was found in the middle ears. In our opinion infection of this cavity was generally due to direct spread of organisms from vomited material in the nasopharynx *via* the Eustachian tube, which in infants is relatively wider, shorter and straighter than in adults. Having reached the middle ear, organisms are readily trapped in the folds of the thick succulent lining mucosa characteristic of infancy. The otitis in most of our cases was occult and this has been the experience of

In England in the fourteenth century the term "leech" was generally applied to the members of the medical profession. They had to belong to the guild or fraternity of Barbers, and might be known as a Barber practicing surgery. There were a few learned masters of surgery. After the union of guilds in 1450, the appellation "Barber Surgeon" came into use. In German countries the barber was generally connected with baths and came to be known as Bader or Balneator. These attendants let blood, sold ointments, pulled teeth, practiced cupping and gave enemas. The monks in the monasteries who required their services for the tonsure, employed them also for blood-letting. Blood-letting was practiced periodically.

John Flint South,³ who was twice president of the Royal College of Surgeons, compiled the earliest records of the barbers and surgeons of the city of London under the title "Memorials of the Craft of Surgery in England." This is no doubt the most authentic work on the beginnings of the barbers who were surgeons and the surgeons who were masters of surgery, their ultimate union as barber-surgeons and their final emergence as the Royal College of Surgeons.

Among the great surgeons of Europe in the fourteenth century were Lanfranc who died in 1306, de Mondeville who lived from 1260 to 1320, Guy de Chauliac, who died in 1368, and Jan Yperman, a Flemish surgeon who died in 1350.

In England John Arderne was born in 1307. D'Arcy Power,⁴ in a Harveian Lecture delivered March 12, 1914, provides an interesting picture of this original surgeon who was skillful in leechcraft, a believer in spells, and the author of a manuscript on a roll of vellum, written before printing was known. The original manuscript is now in the Royal Library in Stockholm. Lanfranc, de Mondeville and de Chauliac were well educated sur-

geons; Arderne learned his surgery in the army. As an example of his belief in magic and spells is his treatment of epilepsy. He recommended that the words Jasper, Melchior and Balthazar be written with blood drawn from the auricular or little finger of the patient. The paper bearing the words was worn by the patient, who said daily for a month three Pater Nosters and three Ave Marias for the souls of the fathers and mothers of the three kings. For constipation Arderne wrote: "Let the man drink 'de brodi'." This was the equivalent of beef tea. However, this was not the common treatment. "If he be rich" he was to have beef tea according to Arderne, "but if he is a pauper he may just drink his own urine."

Here is an example of the surgery of John Arderne:

"I saw a young man with a stone as big as a bean so lodged in his penis that it could not escape through its eye, neither could it be pushed back, but it remained in the middle of the organ as it is here shown. I cured him easily with an incision, for I put him on his back and tied his member with linen threads on each side of the stone to prevent its shifting, and after making a small cut with a lancet over the stone I squeezed it out. I then sutured the skin with a needle and thread over the hole, and dressed it with white of egg and finely ground flour, and having wrapped up the penis in a piece of old and thin linen I let him go in peace for three days. I cut and removed the thread at the next dressing, and in less than a fortnight I had cured him completely. There is no need for alarm in these cases, even though the urine escapes from the wound for three or four days after such an operation, for the patient will certainly be cured."

As might be expected the ignorance of anatomy and physiology displayed by the barbers and itinerant surgeons brought them frequently into conflict with the physicians and with the victims of their barbarities. In 1337, Garrison says, a strolling eye surgeon was thrown into the

ascent to the normally empty duodenum and jejunum of the lower intestinal contents with their coliform flora. Imperfectly digested food present in the small bowel constitutes a rich nutrient medium for coliform bacilli. According to Marriott (1931) the mere fact of overfeeding favours the ascent of coliforms to the duodenum, since the latter never empties completely and accordingly the bowel contents form a continuous culture tube. That ascent of coliform bacilli is secondary to a disordered state of the stomach and upper coils of small bowel would appear to receive confirmation from our results in cases of disease localised to the lower intestinal tract, *e.g.* appendicitis and dysenteric ileo-colitis. Coliform bacilli in the upper coils of small intestine were practically absent in the former disease and scanty in the latter.

While the sequence of events just described, *viz.* the primary digestive disturbance resulting from deficient gastric and intestinal secretion accompanied by irregular peristalsis, explains the majority of cases of gastro-enteritis, one must still account for those small epidemics of apparently infective origin which occur in children's institutions with a clean milk supply. We have investigated several such outbreaks, but have never succeeded in incriminating any one coliform type and it seems to us that the infective agent in these cases may be an ordinary coliform bacillus, the virulence of which has become exalted by growth in an unusual situation, *viz.* the small bowel. Kleinschmidt as a result of his investigation made a similar suggestion and Dufourt proved experimentally that coliform bacilli isolated from cases of infantile diarrhoea were more virulent for guinea-pigs than those from healthy children. The abnormal and highly toxic conditions resulting in the small bowel in acute gastro-enteritis are responsible for the visceral lesions already described. Damage to the liver—the organ generally showing the most advanced pathological change—may be due to toxic substances in the portal blood as suggested by Boyd (1923) on rather meagre data. Bacterial invasion of the tissues is infrequent, the intestinal mucosa forming an almost impenetrable barrier except in cases of marked intestinal inflammation or ulceration, when occasionally in young infants actual coliform septicæmia and meningitis may result.

In over 90 per cent of our gastro-enteritis cases purulent exudate, sometimes yielding a coliform growth, was found in the middle ears. In our opinion infection of this cavity was generally due to direct spread of organisms from vomited material in the nasopharynx *via* the Eustachian tube, which in infants is relatively wider, shorter and straighter than in adults. Having reached the middle ear, organisms are readily trapped in the folds of the thick succulent lining mucosa characteristic of infancy. The otitis in most of our cases was occult and this has been the experience of

well shaped nails, cleaned of all blackness and filth. He should hear many things and speak but few, for a wise man sayeth, it seemeth more to use the eares than the tounge." He also said that "if you had been still you would have been held a philosopher . . . When he shall speak, be the word short and as much as possible fair and reasonable and without swearing."

When Henry V went to war across the channel he arranged for a physician and surgeon to accompany him. His surgeon was Thomas Morstede. The surgeon was directed to take with him twelve of his own craft. He was given the privilege of choosing those who should accompany him. Subsequently the Barbers and Surgeons Company and the Corporation of Surgeons after them were called on to choose surgeons to serve in the army and navy.

Sometime between May, 1421, and May, 1423, the College of Physicians under the control of a rector of medicine joined with the surgeons in petitioning the Aldermen for authority to improve the professional acquirements and social position of themselves and their successor. The surgeons who joined in this move were a society distinct from either the barbers or the barber surgeons and probably originated from the military surgeons. This group got authority to conduct examinations for both medicine and surgery, to assign physicians or surgeons to the poor, to visit apothecary shops and throw away bad medicines, and to make sure that anyone who claimed to have graduated in medicine could submit proof of it. By 1435 this conjoint college of physicians and surgeons seems to have disappeared and in that year regulations were established for the government of the Guild of Surgeons. Dates were established for their assembling and the choosing of the masters. The regulations included the

control of foreign physicians, the taking of cases, of apprentices, and many other types of regulation. An oath was created which was to be taken by each member.

The masters in surgery up to this time had not made any fusion with the barber surgeons. In the year 1452 the Guild of Barbers in the city of London obtained a



Manuscript of *De Arte P*
of Master John A

ia

increase the incidence of coliform bacilli in the small bowel, but the findings generally showed considerable discrepancy

5 In acute enteritis the pH of the small bowel contents appeared to be slightly less acid than in normal subjects

6 Coliform bacteriophage was never found in the small bowel

7 The bearing of the above results on the normal relative sterility of the small bowel and on the ætiology of primary acute gastro-enteritis of children is discussed

REFERENCES

- | | | |
|---|---------|--|
| ARNOLD, L | 1926 | <i>Amer J Dis Child</i> , xxxi 668 |
| " | 1930 | <i>Proc Inst Med Chicago</i> , viii 67 |
| " | 1933 | <i>Amer J Med Sci</i> , clxxxvi 471 |
| ARNOLD, L, AND BRODY, L | 1926 | <i>Amer J Hyg</i> , vi 672 |
| BESSAU, G, AND BOSSERT, O | 1919 | <i>Jahrb Kinderhllk</i> , lxxxix 213 |
| BOYD, G L | 1923 | <i>Arch Int Med</i> , xxxi 297 |
| BURGH, S E, AND GIANELLI, C | 1929 | <i>Rev française de Pédiat</i> , v 681 |
| CASTELLANI, A, AND DOUGLAS, M | 1932 | <i>J Trop Med</i> , xxxv 161 |
| DACK, G M, AND WOOLPERT, O | 1932 | <i>J Prev Med</i> , vi 129 |
| DAVISON, W C | 1925 | <i>Amer J Dis Child</i> , xxix 743 |
| DEAN, L W | 1927 | <i>Arch Otolaryngol</i> , vi 201 |
| DICK, G F, DICK, G H, AND WILLIAMS, J L | 1928 | <i>Amer J Dis Child</i> , xxv 955 |
| DUFOUT, A | 1928 | <i>Rev française de Pédiat</i> , iv 763 |
| DUVAL, C W, AND BASSETT, V | 1904 | <i>Studies from the Rockefeller Institute for Medical Research</i> , ii 7 |
| FINDLAY, L | 1932 | <i>Arch Dis Child</i> , vii 307 |
| GIMINS, R, AND HAWKSLEY, J C | 1932 | <i>Lancet</i> , i 1040 |
| HENNING, N | 1931 | <i>Klin Wschr</i> , x 692 |
| HOLSCLAW, F M, BOERM, C A AND BIERMAN, J M | 1930 | <i>Amer J Dis Child</i> , xxxix 747 |
| HORSTER, H | 1932 | <i>Z ges exp Med</i> , lxxxiv 740 |
| HUNT, H F, BARROW, E, THOMPSON, L, AND WALDRON, G W | 1928 29 | <i>J Lab Clin Med</i> , xiv 907 |
| IZUMITA, T | 1930 | <i>Jahrb Kinderhllk</i> , cxxix 319 |
| KAHN, B S | 1935 | <i>Amer J Dis Child</i> , xlix 939 |
| KANZLER, R | 1932 | <i>Klin Wschr</i> , xi 807 |
| KLEINSCHMIDT, H | 1935 | <i>Ibid</i> , xiv 257 |
| KLEMENTSSON, E | 1923 24 | <i>Acta Pædiat</i> , iii 136 |
| KLIENEGER, E | 1928 | <i>Z Immunitätsforsch</i> , lvi 32 |
| KLIGLER, I J | 1935 36 | <i>Trans Roy Soc Trop Med Hyg</i> , xxix 531 |
| KLUMPP, T G, AND NEALE, A V | 1930 | <i>Amer J Dis Child</i> , xi 1215 |
| KNOTT, F A | 1927 | <i>Guy's Hosp Rep</i> , lxxvii 1 |
| LIGHT, I | 1929 30 | <i>Zbl Bact</i> , Abt I Orig , cxv 320 |
| LOGAN, W R | 1913 14 | <i>this Journal</i> , xviii 527 |

of the books during 1638 and 1639 showed that the books were well bound and fastened by clasps to an iron chain so that they could not be removed. Eventually the properties of the predecessors passed to the Royal College of Surgeons although most of the books seem to have been lost. When the Royal College of Surgeons was established it had at first a governing body which included the Master, the Wardens and the Court of Assistants. These titles had been evolved from the earlier groups. In 1308 there were only Masters. In 1416 the Guild of Barbers had Masters and Wardens. The titles had been inherited from the Surgeons' Company which in turn took them from the United Company of Barbers and Surgeons and they took them from the Barbers' Company established in 1462. The paraphernalia of office coming down from the past included the Mace and the three-cornered hat. The mace is still symbolic and one was sent by the Royal College of Surgeons to the American College of Surgeons and was carried in the procession of that august body when it was organized in 1913.

In 1529 Ambroise Paré came from the provinces to Paris. He was at that time a rural barber's apprentice. His father was a valet and barber, his brother-in-law, Gaspard Martin, a master barber-surgeon in Paris. Soon after coming to Paris he obtained the position of resident in the largest hospital in Paris, the Hotel Dieu. He was then 19 years old. Sometime later he wrote:

"I was resident the space of three years in the hospital of Paris, where I had the means to see and learn diverse works of chirurgery, upon divers diseases, together with the anatomy, upon a great number of dead bodies, as oftentimes I have sufficiently made trial publicly in the physicians' school at Paris, and my good luck hath made me see much more."

The French surgeon owed improvements in his social condition to the fistula of

Louis XIV and its successful treatment by Felix. Felix and his successor Mareschal were made royal surgeons. In 1724 Mareschal obtained from Louis XV the creation of five chairs of surgical instruction at St. Come. The Paris medical faculty revolted, marched in procession to St. Come and harangued against the surgeons. The mass of the people sided with the surgeons. Then in 1731 the Academy of Surgery was founded and in 1743 Louis XV promulgated an ordinance which delivered the surgeons from further association with the barbers and wig makers, who were forbidden to practice. The ordinance further declared that no one could be a master in surgery without being a master of the arts. The Academy of Surgery was abolished in 1792 during the French Revolution. In 1794 a new edict broke down any distinction between physicians and surgeons as separate guilds and practice was thrown open to everybody who could pay for a license. In 1803 examinations and diplomas were revived and a controlled scientific profession was on its way to its present dignified state.

In England separation of the surgeons from the barbers occurred in 1745. The surgeons were elected as masters, governors and the Commonality of the Arts and Science of Surgeons of London. The surgeons left to the barbers the hall, the library, and the silver.

Properly at this point comes a reference to the place of anatomy in the apprenticeship served by the young men who became surgeons. In 1540 the guild of surgeons which had always taught its members and apprentices by lectures got an act providing them with bodies for dissection:

That the sayd maysters or gouernour^s of the mistery and communalte of harbours and surgeons of London, and their succours yerely for euer after their said creacions at their e and plea shal and maie traction foure out i

must be themselves physicians with a training above that of physicians generally. The problems of greed, ignorance, quackery, and inhumanity which troubled the master surgeons and the guilds still remain, and if they are ever to be solved

by social controls, the surgical organizations will have to solve them.

—MORRIS FISHBEIN,
M.D., F.I.C.S. (Hon.)
Chicago, Illinois

REFERENCES

1. Rogers, G.: *Lancet*. New York: G. P. Putnam's Sons, 1956.
2. Fishbein, M.: The Evolution of Surgical Organizations, *Proc. Internat. Coll. Surgeons*, Geneva, May 23-26, 1955. *Medicine et Hygiene*, Geneva, 1955.
3. South, J. F.: *Memorials of the Craft of Surgery in England*. Edited by D'Arcy Power, with an introduction by Sir James Paget. London: Cassell and Company, 1886.
4. Power, D'Arcy: *Selected Writings, 1877-1930*. Oxford: Clarendon Press, 1931, p. 29.
5. Castiglioni, A.: *A History of Medicine*. New York: Alfred A. Knopf, 1947, p. 403.
6. Riesman, D.: *The Story of Medicine in the Middle Ages*. New York: Paul B. Heeber, Inc., 1935, pp. 150-153.
7. Auden, G. A.: The Guild of the Barber Surgeons of the City of York, *Proc. Royal Soc. Med.* 21:1400-05, 1928 (Section on the History of Medicine, meeting held May 18, 1927).
8. Pybus, F. C.: *The Company of Barber Sur-*

geons and Tallow Chandlers of Newcastle-on-Tyne, Section on History of Medicine, *Proc. Royal Soc. Med.* meeting Dec. 17, 1924, 22d session, pp. 287-296, 1928-1929.

9. Cresswell, C. H.: *Surgeons and Barbers or Edinburgh: Their Specialty in 1722*, *Edinburgh Med. J.* 11:44-50, 1913.

10. Cumston, C. G.: *The Corporation of Barbers and Surgeons in England and Holbein's painting*, *New York M. J.* 95:177-178, 1912.

11. Peachey, G. C.: *A Memoir of William and John Hunter*. Plymouth, England: John Brendon and Son, Ltd., 1924.

ADDITIONAL SOURCES

Griffith, E. F.: *Doctors by Themselves: An anthology*. Foreword by Rt. Hon. The Lord Horder. London: Cassell & Co. Ltd., 1951.

Major, R. H.: *A History of Medicine*. Springfield Ill., Charles C Thomas, Publisher, 1954, pp. 451-453.

Simplicity in Medical Writing

THERE has always been a need for the concise and simply written medical paper. This, however, is not as simple as it seems, because the moment the physician puts pen to paper he is no longer the plain-spoken, kindly practitioner of the art of medicine, but an entirely different person. He becomes ultra-scientific and on occasion may find himself in a miasmic labyrinth of gobbledygook. Chesterton's advice—"To write simply is the essence of good English"—is easily forgotten.

It is not necessary to begin with the statement that the subject is interesting. It is up to the writer to prove that. It is best to begin with a brief statement as to

what it is all about, and then get on with the subject matter.

Historical asides should be brief and not put in the introduction. Several paragraphs farther on, if the reader is tiring, a well written, compact bit of history may stimulate his interest.

The observation that the scientific knowledge of the ancients was obscure has no place. Everyone knows that, and no apology need be made for men of bygone ages, who in some respects were better observers than the physicians of today. They possessed the virtue of presenting their thoughts briefly and clearly.

Bibliographic material should always dreary furniture. It

possibility has existed that the phage was not actually produced, but merely made evident, in a culture in which it had always existed, either as a contaminant or in some form of association with the bacteria. Burnet takes the view that the question of origin is not urgent and that it can be left in abeyance in the meantime. As will appear later, however, the question is urgent in the particular case with which we propose to deal, because there is an apparent frequent generation of new phages. Moreover it is surely the case that if the question of origin can be settled, the evidence obtained may help in the elucidation of the nature of the lytic agent.

Recently we have been able to study the phages which make their appearance in cultures of lactic streptococci. The phenomenon has a great deal of interest from a commercial point of view since it interferes with the manufacture of cheese on a large scale, but apart from this there are some new features of a fundamental nature which seem to give indications from a fresh angle that phage may be a product of bacteria.

Conditions promoting the appearance of streptococcal phage

Ever since cultures of lactic streptococci have been used in dairy work for the purpose of producing lactic acid in milk and cream they have been observed to suffer sudden failures in activity from some unrecognised cause. Whitehead and Cox (1936) were able to show that many such failures are due to the sudden rapid development of streptococcal phages which lyse the organisms and thus prevent the normal fermentation of milk sugar. In commercial practice in New Zealand the trouble of culture failures is so general as to suggest that most lactic streptococci are subject to attack by phage, a conclusion which is borne out by descriptions of similar difficulties in other countries. Until recently, however, the streptococcal cultures used in dairy work have usually consisted of a mixture of several strains of organisms. It is extremely difficult to follow the sequence of events when a phage active against only one strain appears in a mixture of several strains very similar in appearance under the microscope. It was therefore only recently, after the use of pure cultures of single strains had been introduced in practice (Whitehead and Cox, 1935), that the role of phage in the failure of cultures became evident. A phage which develops in a pure streptococcal culture in milk causes complete disappearance of organisms from the medium and its presence is therefore amply demonstrated.

The evidence to be brought forward in the present paper is the result of work with species of lactic streptococci which were selected in the first place on account of their active habits of growth and high optimum temperature. These properties rendered them particularly suitable for use

BOOKS REVIEWED

Le Traitement Chirurgical des Hernies de l'Adulte chez l'Adulte (The Surgical Treatment of Inguinal Hernia in the Adult). By Henri Fruchaud. Paris: G. Doin et Cie, 1956. Pp. 386, with 210 illustrations.

Prof. Fruchaud points out that the Bassini operation, including its various modifications, is followed by recurrence in 2 per cent of cases of indirect inguinal hernia and 14 per cent of cases of direct inguinal hernia. The percentage of recurrence is highest in patients over 25 years of age (10-15 per cent from 25 to 35 and 30 to 40 per cent after 45).

The book is divided into five parts. Part 1 is a critique of the Bassini operation and its numerous modifications (Zimmerman, Andrews, Berger-Halsted). The author states that hernias cause distortion of the deeper structures of the inguinal canal. He points out that current operations limited to repair of the inguinal canal and rings, and even corrective operations, are insufficient. He describes the technic he has devised for total reconstruction of the inguinal region.

Part 2 is devoted to troublesome complications of herniotomy: (1) infection of the wound, which delays healing, favors recurrence of hernia and results in an ugly scar, and which can be prevented by rigid asepsis and careful handling of tissues, and (2) cellulitis and phlebitis resulting in testicular infarct and embolus formation. These can be prevented by careful dissection without trauma to the deeper vessels and resection of the sac without removal of the part adherent to the cord. Operative repair should be performed so as to assure sound healing.

Part 3 describes the technic of the author's operations designated as 1 and 2. The first two stages are the same for the two procedures and consist of: (1) adequate exposure of the inguinal region and (2) careful dissection, mobilization of the cord and correction of the peritoneal defect. The third stage consists of reconstruction of the abdominal wall with two rows of sutures—one superficial and one deep—below the cord,

uniting Cooper's ligament and the deep transversalis and external oblique fascia and thus obliterating Hesselback's triangle. In some instances it is difficult to utilize the transversalis fascia because of its insufficient length. This defect is overcome by inserting a layer of nylon mesh and suturing its inferior border to Cooper's ligament, thereby reinforcing the transversalis fascia. Nonabsorbable sutures are employed throughout, i.e., silk, linen, cotton or stainless wire.

Part 4 deals with operations designated as 3 and 4, devised for simplified reconstruction of the inguinal canal in debilitated old men, and women, and by the technic used for repair of femoral hernia.

Part 5 is a correlation of the author's results after operations 1 and 2. There have been no recurrences in 200 herniotomies, 30 of which were performed as long as four years ago. One-third of the patients were between the ages of 40 and 75 years; 35 presented recurrent hernias; 11 had massive hernias adherent to the large intestine. The author attributes success to his technic, which obliterates the offending funnel-shaped peritoneal depression, thus reinforcing the lower abdominal wall. The repaired peritoneum forms a solid resistant plane that does not bulge upon coughing and prevents the recurrence of hernia.

The book is, in short, a full presentation of the author's perfected technics for herniotomy. It has 210 illustrations by Arnold Moreau and an extensive bibliography of over 500 references. Surgeons interested in herniotomy will find much helpful information in this volume.

CHARLES PIERRE MATHÉ, M.D.

Synopsis of Gastroenterology. By R. Schindler. New York and London: Grune and Stratton, 1957. Pp. 395.

The *Synopsis of Gastroenterology* was written specifically for the general practitioner and the internist. The intern and resident will also find much of practical value in it.

inoculated with a pure streptococcal culture, a phage often appears, with results similar to those which occur in aerated milk. This is how the phenomenon manifests itself in commercial practice and, with certain milk supplies, the significant factor seems to be merely "bulk" of the milk medium. A small amount of milk culture behaves normally, but failures often occur whenever the preparation of a large amount of culture is attempted. There is a definite indication that some unknown constituent which varies either in concentration or in its effect in different milk supplies is the ultimate causative factor.

Both types of failure of the cultures (or of appearance of phage) are spasmodic in occurrence. Cultures at certain times seem to be in a "sensitive" state and are readily susceptible to phaging in any milk supply, under the influence of either of the above treatments. Aeration of a synthetic medium will also cause such a culture to undergo self-phaging. At other times cultures cannot be made to fail in certain milk supplies, although they do so readily in milks from other sources. When in the so called "sensitive" state, the cultures at an age of 24 hours appear to contain phage in very low concentration. The phage apparently has developed slightly late in the life of the culture, altered conditions of culture (aeration or the factor associated with bulk or even on occasion a slightly higher incubation temperature) would appear to stimulate an earlier appearance of the phage, with consequent lysis of the organisms and an enormous development of phage. In cultures of streptococci which are not in the "sensitive" state, phage cannot be detected in filtrates from the milk cultures, yet phaging may occur in one generation in a different batch of milk.

Thus while in some cases phage appears to be present in a culture in some form of association with the organism, there are many instances in which the appearances, taken at their face value, seem to indicate that the organisms produce phage under the influence of a change in the conditions of growth. This sudden "flaring up" of phage under the influence of cultural conditions is a phenomenon which has not been observed in like degree with organisms other than the lactic streptococci. As described by most workers, the isolation of phages from apparently normal cultures has involved a long series of filtrations with addition of the filtrates to succeeding cultures. It is, however, quite possible in the present case to imagine a phage "occluded" within the bacterial cells, or existing in some form of association with the cells, the balance being swung in favour of organism or phage according to certain unspecified growth conditions. Burnet (private communication) apparently favours this view and extends it to include lysogenic forms.

Apart therefore from the rapidity with which phage makes its

am 1. HWK and 15 Kg. am 7. HWK).

The application remains unsuccessful if there has been immediate flaccid paralysis, or if there is priapism, which, among other symptoms, indicates total severing of the cerebral portion of the spinal cord. The method has also proved successful with pathologic luxation of the atlas and, exceptionally, with compression of the vertebral portion of the spinal cord associated with severe scoliosis, with fractures of the lumbar portion of the spine and with spondylitis tuberculosa, particularly when employed in preparation for surgical intervention.

Lindemann (M 540) expressed the opinion that *juvenile kyphosis* is associated with a developmental disturbance in the chorda and therefore, with dysostosis enchondralis. After extensive roentgenologic and histologic investigations, Reske (M 489) attributed an essential significance to the paravertebral tissue shadow in the development of scoliosis. That shadowy outline, in his opinion, is caused by inflammatory and reactive changes in the retro-aortal subpleural connective or adipose tissue in connection with the pleura, and represents an active and passive force hampering growth.

Wilhelm (M 221) discussed the possibility of intrauterine epiphyseal damage to the vertebral column caused by anomalies of position and by oligohydramnios in connection with prenatal disorders. He advocated early treatment by means of a posterior shell or gymnastics. In the opinion of Felix (M 446), attempts at removal, alleviation or elimination of scoliosis by rib plastic procedures are abortive, according to postoperative examination, since it is impossible to compensate for the torsion. He predicted improvement from a combination of those interventions with use of spans of the vertebral column by the Lange method. Scheuer reported (M 48) 4 cases of scoliotic paralyses due to a transverse lesion, which he was able to cure respectively by conservative treatment and laminectomy respectively. The paralyses occurred at the time of greatest development. This observation supports Lange's demand for surgical intervention in cases of progressive scoliosis.

According to Weil (G 1129), sciatica in

many cases is the result of pressure damage to the nerve cells within the vertebral canal. Medial prolapse of the root produces sciatic scoliosis on the opposite side. In cases of scoliosis with lateral prolapse the vertebral column is averted to the side of the prolapse (representation of distance). For operation on the *prolapsed lumbar disc*, Schroder (A 1785) recommended peridural anesthesia (eleventh and twelfth thoracic for soft tissue and fifth lumbar-first sacral for the nerve roots). The ligamentum flavum should always be fenestrated to provide enough room for the roots. Only loose or disconnected segments of disc tissue should be removed.

According to Penholz (D 120), the results of surgical intervention are the better the more exactly the loose and disconnected tissue is removed. Various methods are employed in the use of contrast media in the vertebral canal to diagnose prolapse of a disc. Stirnweis (C 120) expressed the opinion that scout films suffice for diagnosis and for determining the level of the prolapse. Kloss (B 91) recommended functional myelographic study because it delineates also labile prolapse, he believes as well, in his opinion. Reinhard (O 809) and Koberg (O 236) recommended abroadil for myelographic study. Panter, in collaboration with Reinhardt, wrote a special treatise on the contrast method as applied to the apical sac and its variants, e.g., discographic and peridurographic study. Decker (F 1691) emphasized the fact that suboccipital gas myelographic study with elevation of the pelvis offers excellent possibilities for diagnosis of tumors of the spine and prolapse of the discs, agreeing with Pia (O 170) as to the simplicity and safety of this method. If there is reason for suspecting a tumor, Reinhardt, too, has expressed preference for gas myelographic study.

Lower Extremities.—Hohmann (G 54) pointed out that many failures in the treatment of the so-called *congenital hip luxation* are due to belated treatment. He insists on early treatment combined with rotation osteotomy later. According to Penners (R 393), this luxation can be diagnosed within the first four weeks, because the Perrin-Ferraton disease appears whenever the hip

check had not been kept on whether the secondary cultures were lysogenic. A fresh start was made by careful purification of the culture and phage. A preparation of the latter was obtained in such strength that one drop (about 1/500 ml) of a 10 million dilution placed on a plate gave numerous plaques.

A culture of RW in 250 ml of sterile skim milk was incubated at 30° C with the addition of one drop of a 1000 dilution of phage until microscopic examination showed that phaging had occurred. The culture was then transferred to the 20° C incubator. When, in 2 days' time, coagulation of the milk occurred, a loopful was spread on the surface of yeast whey agar. After incubation of the plate at 20° C for 2 days, colonies were picked into sterile milk and the resulting cultures investigated for acid producing power, resistance to the RW phage and lysogenic power. All the cultures were resistant and adequately vigorous, but some were found to contain small concentrations of RW phage regularly in their filtrates. One culture, RW1, which did not appear to be lysogenic, was selected for the purposes of the experiment and was subjected to the following tests.

(1) The culture was transferred daily in tubes of sterile milk containing a drop of undiluted RW phage. No action of the phage on RW1 was evident over several days.

(2) Cultures RW and RW1 were sown into a tube of sterile milk containing RW phage. After growth for 24 hours a filtrate from the culture (shown to contain RW phage) was added to a further mixed culture and the process repeated in series for several days. Even after several generations the filtrates from mixed cultures showed no action on a culture of RW1.

(3) Cultures RW and RW1 were sown together into a flask of sterile milk. After growth for 24 hours at 20° C a filtrate from the culture proved to be without effect either on RW or RW1.

(4) Filtrates from cultures of RW1 were regularly shown to have no action on RW even when an amount up to 1 ml was added to 10 ml of sterile milk sown with RW.

Thus it appeared certain that culture RW was completely resistant and non-lysogenic. The culture was then sent to a dairy factory, where at the time phages were particularly liable to appear in cultures. It was sown into a can containing 10 gallons of milk which had been heated to 95° C for 2 hours and then cooled to 20° C. After 18 hours' incubation at 20° C, the culture was found to be completely phaged and it was quite easy to isolate from the still liquid milk a phage active against RW and RW1. It was not possible to stimulate the appearance of phage on a culture of RW1 in the laboratory. Culture RW1 continued completely resistant to phage RW over the whole period (about 6 months) during which the two phages were under investigation. Attempts to adapt RW to culture RW1 were consistently unsuccessful.

In attempting to determine the possible origin of phage RW1, there are three possibilities to be considered.

(1) Phage RW1 may have been a contaminant which gained access to the can of milk from its surroundings. This possibility cannot be excluded, but if due weight be given to the findings

cent. Different methods of treatment are (1) conservative treatment with withholding of food (Dörfler); (2) conservative treatment with provision of food (Meulengracht), and (3) radical resection (Finsterer).

Schwarz (A 449) reported on late results after gastric resection, with anterior and posterior anastomosis. Of the 170 resections, 50 per cent included anterior and 50 per cent posterior gastroenterostomy. The two methods produced identical results.

Ulitsch (A 745) explained his position in cases of total and "enlarged total" gastric extirpation and the duration of survival for patients operated on with this technic. He strongly urged total gastrectomy in all cases of scirrhus, carcinoma fibrosum and linitis plastica, pointing out that the abdominal approach is almost always sufficient. As anastomosis the esophagojejunostomy is adequate. For a high lying carcinoma of the cardia he recommended approach through the two cavities. With regard to the period of survival, the progress is still poor.

Nakayama (C 266) presented an estimate of the different operative technics for total gastrectomy, taking into account his own 260 cases. His conclusions were as follows:

1. The direct esophagoduostomy is practicable only if there is no great occlusion at the point of anastomosis. Sustaining sutures have to be applied between the diaphragm and the head of the pancreas. With this technic the mortality rate amounts to 2.2 per cent.

2. The interposition of different intestinal loops between the esophagus and the duodenal stump is technically difficult and means an additional operative burden for the patient. It is the best method, however, for the physiologic mechanism of digestion, because the transplanted loop takes over the stomach's function and the passage through the duodenum remains open. The mortality rate of this method is zero.

3. In esophagojejunostomy the passage of chyle through the duodenum is eliminated, which is disadvantageous to digestion. With this technic the mortality rate is 2 per cent. Sustaining sutures have always to be applied for the purpose of unburdening the anas-

tomosis. Suturing of the anastomosis must be performed in two layers. Postoperative complaints of difficulty in swallowing are due to scar strictures or relapses. Scar strictures are present with esophagoduodenostomy in 43 per cent of cases; with esophagojejunostomy, in 31.8 per cent and in operations done by joining intestinal loops, only 11.1 per cent.

After presenting indications for total extirpation of the stomach, Nakayama (C 277) described his own method. He resects the pancreas at the crossing point of the medial colic artery, simultaneously cleaning the celiac lymph nodes.

He investigates beforehand the possibility of operation by means of transperitoneal splenovenographic studies. Stenosis and passive congestion of the splenic vein prove the carcinoma inoperable (irruption into the retroperitoneal region). The mortality rate associated with this method is 2.05 per cent.

To avoid rapid evacuation after total gastric resection, Mandl (P 403) performs two Braun's anastomoses, one located behind the other, below the esophagojejunostomy. Rainer and Zollner (D 371) observed 59 cases of anemia after total gastrectomy. They recommended treatment by administration of vitamin B₁₂ and iron.

For carcinoma of the fundus with extension in the direction of the cardia and for genuine cardiac carcinoma, Holle and Heinrich (C 164) advocated the two-cavity operation according to Lewis Ivor, with esophagoantrostomy. They approach by their own method, however, an isolated tumor in the fundal area, i.e. They resect the superior gastric segment and perform a subdiaphragmatic esophagoantrostomosis. The same is true of an ulcer near the cardia. Subdiaphragmatic fundectomy is performed by abdominal removal of the superior gastric segment and the establishment of an end-to-end anastomosis between the intra-abdominal portion of the esophagus and the remainder of the pyloric segment. In order to insure adequacy of the anastomosis, the esophageal rami of the left gastric artery and the left caudal phrenic artery must be preserved at all costs. The blood supply of the esophagus, coming from below, extends as far as 3 cm. above the diaphragm.

group and against several phages in the R group of organisms (*i.e.* R phage and its "secondary" phages)

The sera were prepared in a series of dilutions and to each dilution was added an equal amount of phage so diluted that in the absence of neutralisation a loopful of the mixture placed on a plate spread with the sensitive organism would produce, after incubation, a zone of almost complete lysis. In effect, the phage dilutions were such that all the phages had approximately the same power. After incubation of the serum-phage mixtures for one hour at 30° C a loopful from each tube was placed on a plate spread with the sensitive organism. The results were read after incubation of the plate for 18 hours at 30° C and are shown in the foregoing table.

It is evident that there is a strong antigenic relationship between phages RW and RW1. Phages in the RW group were serologically similar and in the R series quite distinct, although the lower serum dilutions did neutralise some of the R series. It is interesting to observe that of the "secondary" R phages, phage F, which is distinguished from the others by its smaller plaques and lower thermal death point, is also least affected by the sera. The main point of interest, however, in the results is the close relationship shown between phages RW and RW1, this lends additional support to the theory that phage RW1 has some connection with the original RW phage or with the organism on which it appeared.

Specificity of the streptococcal phages

In work designed to throw light on the origin of phages it is obviously necessary to exclude if possible any suspicion of the cultures being contaminated from outside sources. Even in the laboratory, however, it is extremely difficult to realise ideal conditions and probably the most rigid technique would not eliminate all doubt. In the present case the possibility of contamination is evidently the weakest link in the chain of evidence which suggests a bacterial origin for phage. All the phages with which this paper deals were isolated from material prepared under commercial conditions, and although in many instances where phage appeared every precaution was taken to avoid contamination, it was never possible to ensure that the technique employed was sufficiently rigid to give complete asepsis. There are, however, several considerations which render contamination as an explanation of the phenomena unlikely. The work of Evans (1936) indicates that there is a much greater degree of specificity between phage and organism among the hæmolytic streptococci than among organisms of the colon-typhoid-dysentery group and our experiences with the lactic streptococci give many indications in the same direction.

Our two main types R and RW belong to the same species (*Str cremoris*) and are to be distinguished only on morphological

with a glance at the pathophysiologic aspects of the subject. According to the world medical literature, the average mortality rate is 8.6 per cent.

Peritonitis as a cause of death has declined sharply. Among 800 operations performed by Block on the extrahepatic bile ducts, the mortality rate for men was 80 per cent and for women 12.1 per cent. Before operation, functional tests of the liver and kidneys must be made, since the hepato-renal syndrome may occur. Block described the clinical picture of that syndrome and of diseases in which hepatic damage is in the front rank: hepatic crisis, hepatic coma, hepatargy and other conditions are included in the hepatorenal syndrome. Disturbances of function of the extrahepatic bile ducts, the so-called dyskinesia: *nervi splanchnici* increase the tonus and motility of the bile ducts, while the vagus acts in the opposite manner. There is confusion as to whether the sphincter of Oddi in the gallbladder neck (Lütgens) acts synergistically or antagonistically. After cholecystectomy, irritability of the sphincter of Oddi may persist. Block refuses to operate on the vegetative nervous system in case of dyskinesia of the bile ducts, recommending a procaine block from the ninth to tenth thoracic level on the right side.

Contrary to this opinion, Rosenauer (D 864) recommended that in such cases both splanchnic branches be severed below the diaphragm either retroperitoneally or transpleurally, according to Kux. One must be sure, however, that there is only a functional syndrome. Psychogenic disturbances must be excluded.

Hess (D 857) pointed out that postoperative complaints after cholecystectomy are often caused by gastritis, ulcers and colitis.

In the presence of colic and bile stasis, however, there are usually changes in the bile duct system. Their causes may be detected by intraoperative cholangiographic study, which is also recommended by Wulff (D 877).

In patients with such complaints Hess (D 857) observed stones in the bile ducts in 27.5 per cent of the cases; stenosing papillitis in 37.5 per cent; chronic pancreatitis in 10 per

cent; stenosis caused by scars in 12.5 per cent, and hepatic stenosis in 50 per cent. Papillitis was present in 59 per cent of all cases of cholelithiasis.

Hilgenfeldt (D 877), pointing out that operative cholangiographic study is not always possible in small hospitals, recommended the insertion of a T drain into the choledochus and a postoperative cholangiographic study of the area above the T drain.

Fischer (D 810) maintained that *stone formation* in the choledochus is possible only in cases of choledochus stenosis. With stones present in the deep bile ducts, icterus is facultative in only 60 to 75 per cent of the cases. A careful anamnesis should be taken, as well as a roentgenogram of the bile ducts with a contrast medium.

A suspected stone in the choledochus is sufficient cause for operation, but the choledochus should be opened only if there is a true indication, and a blocking stone in the cystic duct is no contraindication. According to the literature, stones in the choledochus are overlooked in 20 to 68 per cent of operations on the gallbladder.

Opening of the choledochus is imperative if (1) there are palpable stones in the choledochus; (2) there is a history of icterus or cholangitis; (3) the choledochus is dilated; (4) if small gallstones are present; (5) the ductal system is enlarged and extended and the gallbladder contracted, or (6) puncture of the choledochus reveals opacity or sand-like bile.

Fischer mentioned the value of operative cholangiographic study, which, among other advantages, makes it possible to determine the number of gallstones present. After the stones have been removed from the bile ducts with a stone spoon, palpation by probing and irrigation should be done and a new roentgenogram taken. Stones wedged in the papilla rarely call for the transduodenal splitting thereof.

Fischer (D 810) recommended choledochus drainage by T drain according to Kehr. Loss of fluid bile can be avoided (Mollowitz, D 877) by inserting an additional plastic cannula into the duodenum.

Löffler and Spohn (D 877)

group and against several phages in the R group of organisms (i.e. R phage and its "secondary" phages)

The sera were prepared in a series of dilutions and to each dilution was added an equal amount of phage so diluted that in the absence of neutralisation a loopful of the mixture placed on a plate spread with the sensitive organism would produce, after incubation, a zone of almost complete lysis. In effect, the phage dilutions were such that all the phages had approximately the same power. After incubation of the serum phage mixtures for one hour at 30° C a loopful from each tube was placed on a plate spread with the sensitive organism. The results were read after incubation of the plate for 18 hours at 30° C and are shown in the foregoing table.

It is evident that there is a strong antigenic relationship between phages RW and RW1. Phages in the RW group were serologically similar and in the R series quite distinct, although the lower serum dilutions did neutralise some of the R series. It is interesting to observe that of the "secondary" R phages, phage F, which is distinguished from the others by its smaller plaques and lower thermal death point, is also least affected by the sera. The main point of interest, however, in the results is the close relationship shown between phages RW and RW1, this lends additional support to the theory that phage RW1 has some connection with the original RW phage or with the organism on which it appeared.

Specificity of the streptococcal phages

In work designed to throw light on the origin of phages it is obviously necessary to exclude if possible any suspicion of the cultures being contaminated from outside sources. Even in the laboratory, however, it is extremely difficult to realise ideal conditions and probably the most rigid technique would not eliminate all doubt. In the present case the possibility of contamination is evidently the weakest link in the chain of evidence which suggests a bacterial origin for phage. All the phages with which this paper deals were isolated from material prepared under commercial conditions, and although in many instances where phage appeared every precaution was taken to avoid contamination, it was never possible to ensure that the technique employed was sufficiently rigid to give complete asepsis. There are, however, several considerations which render contamination as an explanation of the phenomena unlikely. The work of Evans (1936) indicates that there is a much greater degree of specificity between phage and organism among the hæmolytic streptococci than among organisms of the colon-typhoid-dysentery group and our experiences with the lactic streptococci give many indications in the same direction.

Our two main types R and RW belong to the same species (*Str. cremoris*) and are to be distinguished only on morphological

roentgen radium therapy. But only resection of the tumor offers a certain chance for curing.

With 97 esophageal operations from 1947 to 1954, Decker, Hahn, and Saegesser (U 1, 17) encountered a mortality rate of 40 per cent. They consider the operation advisable solely for cardia carcinoma, but prefer roentgen therapy in cases of genuine esophageal carcinoma. They calculated a survival of only two and two thirds months for their patients from 1939 to 1949, if they had been treated merely with gastrostomy and irradiation.

Wurnig (D 504) examined his material on 198 carcinomas, both of the esophagus and of the cardia, for mention of previous diseases that may have produced carcinoma. Among these he listed traction diverticula, lye stenosis, esophagitis with cardiospasm and the "short esophagus displacement" of the cardia into the thorax. Hiatus hernia was not included. In his opinion the origin of a cardiac carcinoma as a result of a hiatus hernia is unlikely.

According to Krauss and Betke (F 465 and F 491), there is only one esophageal malformation among 1,000 to 2,000 deliveries. The most frequent is atresia, with a blind stump and a fistula stretching from the lower segment to the trachea at the level of bifurcation (carcinoma in 90 per cent of all cases). Of 12 patients operated on for esophageal deformities, only 4 could be saved. Wachsmuth (Z 209) demonstrated by color film at a meeting of German surgeons in 1955 his technic for the surgical treatment of atresia of the esophagus.

Denecke (Z 209) reported on the treatment of esophageal stenosis in an infant, 10 months old. The condition had developed after surgical removal of a congenitally atresia esophagus.

The use of bougies for such stenosis is rendered more difficult by prestenotic diverticula, and there is danger of perforation. Denecke, therefore, recommended continuous treatment with bougies, the bougie being left in the esophagus for some time. In this way the scar tissue becomes softened and is able to tolerate further dilation without trouble. This treatment should be applied only clinically.

For more exact treatment of organic or functional strictures of the esophagus, Donner and Teschendorf (Y 202) recommended the use of gelatine capsules filled with barium pap. They are of different sizes for better testing the capacity of the stenotic organ. Capsules that come to a dead stop dissolve, and in this way the passage becomes free again very soon. The authors considered the procedure highly valuable because the capsules measure esophageal lumen correctly and, in this way, clearly point to the correct treatment.

Vogel and Jacobsen (Z 214) reported their experiences in dividing the diverticulum threshold according to Mosher. Of 34 patients, each with an esophageal diverticulum, four-fifths showed improvement when reexamined. In one-fifth there was no change. No dangerous accidents, either operative or postoperative, have been observed. According to the authors, the success of endoscopic splitting of the diverticulum almost equals that of extirpation.

Nissen (H 941) called attention to the fact that complaints of dysphagia do not necessarily bear a direct proportion to the size of the diverticulum. If one examines the anamnesis in a case of small diverticula, one notes that dysphagia antedates considerably the proof supplied by roentgen and endoscopic studies. Consequently, Nissen assumed that abnormal contraction reactions of the muscles have a part in the development of the ailment and that it is even likely that they are responsible for its developing.

Ott reported the bridging of an esophageal stricture by utilizing a pulsating diverticulum of the esophagus.

Peter (A 245) reported an unusually large leiomyoma of the esophagus, thus adding another to the 46 cases known to have been reported in the world literature. The tumor measured 10 by 5 by 5 cm.

Schütz (A 1877) observed a case of dysontogenetic cyst of the esophagus, located in the lower segment. It was possible to extirpate the cyst from the muscularis without opening the mucosa. Such cysts are among the rarest esophageal tumors; only 9 cases have been reported.

On the whole, therefore, it is considered that the specific relations between phage and type of organism within the streptococcal species renders the possible derivation of phage by contamination unlikely if not absolutely impossible

Discussion

In most instances where it has been claimed that phage has originated from a bacterium, the possibility has existed that phage has always been present in the culture in some form of association with the organism and that the particular treatment involved in demonstrating the phage has merely served to swing the balance in favour of phage action. In the present series of experiments this possibility exists with regard to the original phage isolated, but it is difficult to apply the argument with equal force to the "secondary" phages which develop on resistant cultures. Only one case has so far been subjected to a rigid and critical examination, but the results obtained indicate that the interpretation one is inclined to put at first sight on hundreds of similar happenings in commercial practice is the true one. Whereas with other types of organisms it is apparently unknown for secondary phages quite distinct from the original phage to develop on resistant cultures, among the group of lactic streptococci this happening is exceedingly common. There is a strong suggestion that the organism, under the influence of some undefined environmental condition, gives rise to the phage which attacks it. The possibility that exists for the derivation of phage by contamination is the only weak point in the theory, but the specificity of the phages for the streptococcal types and for the completely immune forms with which this paper deals, seems to us to make it improbable that contamination is a factor.

It seems possible that the sudden appearance of phages in culture may depend essentially on conditions which do not usually obtain in laboratory work. The phenomena described in the present paper would not have been encountered had it not been for the practice, necessary in commercial dairy factories, of preparing large bulks of culture. Organisms other than the lactic streptococci might react similarly under similar circumstances. Unfortunately, in the absence of knowledge on the specific environmental factors which condition the phenomenon, it is not yet possible to cause the appearance of phages at will. The development of a new phage on a resistant culture is a matter of the chance finding of requisite conditions. When the conditions can be defined, it will be possible to test the theory advanced much more rigorously.

Zenker (D 509) performed 17 resections for bilateral processes after irreversible collapse measures. One patient died; postoperative complications occurred in 3 cases. Zenker emphasized the fact that this relatively unfavorable result was conditioned by the preceding collapse therapy. For this reason he insisted on more careful and detailed reflection with regard to resection before surgical collapse therapy is undertaken.

Brunner (U 177) reported on his surgical treatment of *bronchiectases* (111 resections with 3 deaths). He observed no bronchial insufficiency, but there were several cases of alveolar insufficiency after segmental resection. Reexamination showed that it is not the hyperextension of healthy lung parts, but the remaining presence of diseased parts, that causes postoperative ectasia. Postoperative sputum containing pus is, according to him, a hint that bronchiectasia is still present and calls for further resection. According to Brunner, adolescence is the most favorable time for resection. For bilateral disease he first resects the more severely diseased side.

Strahlberger and Wenzel (U 160) reported the results obtained in 34 patients operated on for bronchiectasia. The operations were done four to eight years ago. The result was determined by the possibility of complete recovery from the initial disease.

Patients with diffuse bronchiectasia permitting only incomplete resection showed only transitory improvement. The functional late result was dependent upon the loss of parenchyma. After lobectomy there was no fundamental change in ventilation capacity. On the other hand, after more extensive resection there were signs of functional hyperextension of the rest parenchyma.

In patients below the age of 50 the condition of the remaining parenchyma was satisfactory. In older patients there was an increased tendency to emphysema.

Reitter (D 520) reported on the surgical problem of the so-called "chronic pneumonia." He applied that expression to the terminal stage of unresolved pneumonia, calling the changes that accompany other pulmonary diseases "secondary pneumonia" and noting, as causes, stenosis and ectasia of the bronchial

tree, pulmonary cirrhosis or fibrosis following roentgen treatment, the inhalation of certain gases and changes occurring after severe trauma. To these he added genuine pulmonary gangrene. He operated on 60 of 74 patients, with a mortality rate of 13 per cent. The cause of death in almost every case was failure of circulation.

Difficulties present themselves in diagnosis as well as in technic and postoperative treatment. The last-mentioned is made difficult by the fact that patients with chronic pneumonia have usually been treated with antibiotics for a long time, which has made the organisms resistant.

Geissendorfer (D 496) reported his experience in the treatment of 500 patients suffering with carcinoma of the lung. The anamnesis ranged between five and ten months. Of a total of 37.8 per cent of operable tumors, only 8 per cent could be treated by palliative operations. Among 48 carcinomas of the middle lobe, only 2 were operable. The rate of early mortality after pneumectomy was 22.6 per cent. Eleven per cent of the resections resulted in cure for five years. (The decisive point is to reach the two-year line.) Operative results with undifferentiated carcinoma were discouraging. Postoperative roentgen treatment in the cases observed failed to confirm the choice of treatment in 63 per cent.

Salzer (D 501) reported on 911 bronchial carcinomas. In 375 cases only an exploratory thoracotomy could be performed. Salzer rejects palliative operations. Twenty-three per cent of the reexamined patients remained cured for four years. The prognosis was surprisingly poor in cases of peripheral carcinoma among his patients.

Becker and Knotz (U 67) reported on the fate of inoperable bronchial carcinomas, which depends fundamentally upon the type of the tumor. Of a total of 84 patients who underwent thoracotomy, 23 died. The average survival time was six months. Thoracotomy did not produce accelerated growth of the tumor. The average survival for clinically inoperable patients was about six months. Eleven patients refused operation. They lived another six and a half months. Of 147

TABLE I

Agglutination by trypaflavine of smooth strains of B typhosus

	Dilution.	Agglutination of living organisms							
		Strains							
		Ty 2	Watson	Isolated in Barcelonn				H 901	O 901
				32079	23509	33208	E G		
Pure H serum	1 1000	++	+	+	+	++	+	+++	-
Pure O serum	1 100	tr	tr	++	++	+++	+++	+++	+++
	1 1000	f tr	-	+	+±	++	+++	+++	+++
Pure V ₁ serum	1 100	+++	+++	+++	+++	++	-	-	-
	1 200	+	+++	++	++	+±	-	-	-
	1 400	-	±	++	+	+	-	-	-
Solution of trypaflavine in distilled water	1 500	+++	+++	+++	++	+	-	tr	tr
Virulence to mice		High		Intermediate				Low	

The technique of the agglutination tests was that described by Felix and Pitt (1934) Unless specifically stated, readings were taken after 24 hours (incubation for 2 hours at 37° C, and a further 22 hours at room temperature)

± = weakest degree of agglutination which could be estimated with the naked eye

tr = trace

f tr = faint trace } estimated by means of a magnifying lens

The strains Ty 2, Watson, H 901 and O 901 and the pure V₁ serum were kindly supplied by Dr A. Felix of the Lister Institute, London

TABLE II

Effect of growth at 20° C and on phenol agar

Agglutination of living organisms								
	Dilution	Strain Watson grown for 24 hours			Strain 32141, grown for 24 hours			Reading after
		on plain agar at		at 37°C on agar containing 1% phenol	on plain agar at		at 37°C on agar containing 1% phenol.	
		37 C	20 C		37°C	20 C		
Pure H serum	1 500	+	+	—	+	+	—	24 hours
Pure O serum	1 100	tr	+++	+++	±	+++	+++	
	1 1000	—	+++	+++	f tr	+++	+++	
Trypaflavine in dis- tilled water	1 500 {	+++	±	tr	+++	+	—	2 hours 24 hours
		+++	+++	„	+++	++	—	



*Literature, reprints
and measuring charts
on request*

DOCTOR, are you sure . . .

Many times you have undoubtedly prescribed THE JEWETT BRACE. If your patient has received The Jewett Brace, it is equipped with a hinged pad on the sternum; a fixed pad on the pubis, stainless steel bands to hold the lumbar support; with worm screw adjustment; provision for locking the brace on the patient; plastic, impervious to water with no absorption to the skin, covering the sponge rubber pads; the fine workmanship and custom qualities produced by the best brace-making technique from the patient's measurements.

These features are found in The Jewett Brace and to be sure that you have them all, insist that it be lettered in gold on the lumbar pad—"THE JEWETT BRACE."

FLORIDA BRACE CORPORATION

Box 1366, 1511 Harmon Avenue Winter Park, Florida

HAVE YOU CHANGED YOUR ADDRESS?

To insure uninterrupted delivery of your *Journal* please return this coupon or send the same information on a post card to *Journal of the International College of Surgeons, Circulation Office, 10 Columbus Circle, New York 19, N. Y.*

Name _____ Please print

Former Address: _____ New Address: _____

Street _____ Street _____

City _____ City _____

Zone _____ State _____ Zone _____ State _____

For countries outside the United States:

_____ Name of Country

that agar in colloidal form contained in the washings was responsible for the reaction. The undiluted "water of condensation" from sterile agar slopes invariably gave vigorous flocculation with trypaflavine solution.

Following these observations, cultures of virulent strains grown under the various conditions specified in table II were again tested for trypaflavine agglutination, suspensions in saline now being prepared by means of the loop, with a view to avoiding the presence of colloidal agar. Cultures grown on plain agar at 20° C, like those from phenol agar, were now found to give negative results with trypaflavine, whereas the Vi-containing cultures grown on plain agar at 37° C were still agglutinated by the dye, though the reactions were markedly weaker than those obtained with ordinary agar-containing suspensions.

The flocculation by trypaflavine of suspensions containing bacteria and colloidal agar seems to be rather a complex reaction, its result representing more than a mere summation effect of two flocculation reactions proceeding independently of each other. The degree of flocculation by trypaflavine of washings from sterile agar slopes is distinctly reduced in the presence of smooth typhoid bacilli which are devoid of Vi antigen, but is enormously increased in the presence of Vi-containing bacilli. On the other hand, colloidal agar seems to have an entirely different effect on the trypaflavine agglutination of rough typhoid bacilli. In this case suspensions prepared by means of the loop react more strongly than the agar-containing suspensions prepared by washing off the agar slants, the colloidal agar apparently acting as a protective colloid.

It is obvious that the simple trypaflavine reaction could not be used as a reliable test for the demonstration in typhoid bacilli of Vi antigen or for the differentiation of smooth and rough variants. Pampana (1931 and 1933) apparently encountered some of the sources of error inherent in the test. In his description of the technique he emphasised the danger of observing "pseudo-agglutination," especially when slide agglutination is used. "the greatest care must be taken in the gradual mixing of the bacteria with the solution because the mixing of the germ suspension with the whole droplet of trypaflavine at once may cause a pseudo-agglutination" (Pampana, 1933). According to this author equal volumes of bacterial suspension and trypaflavine solution (1:500) should be mixed, when the reaction is being performed in test tubes. Since the technique used in the agglutination tests was that advocated by Felix, according to which one drop (0.05 c.c.) of the dense bacterial suspension was added to the dilution of serum or trypaflavine contained in a total volume of 1 c.c., the experiment shown in table III was carried out to determine

TABLE IV

Trypaflavine agglutination of smooth and rough variants of B typhosus

Suspensions in saline	Agglutination by trypaflavine dilution 1 : 500 in distilled water	
	Strain Watson, smooth rich in V ₁ antigen	Strain H 901, rough devoid of V ₁ antigen
Growth from plain agar washed off with saline	+++	+±
Growth from plain agar suspended by means of the loop	+	+++
Growth from phenol agar suspended by means of the loop	f tr	+++

Readings after 2 hours at 37° C

The observations recorded in this paper were first communicated to the Academia i Laboratori de Ciencies Mediques de Catalunya (Grifols i Roig, 1936). At the same time Sertic and Boulgakov (1936) reported that in normal smooth strains of *B typhosus* there was complete disagreement between the results of the reactions obtained with Millon's reagent (White, 1929) and with trypaflavine, and that the latter reaction was dependent upon the V₁ antigen of *B typhosus*. It has not yet been adequately investigated whether similar sources of error interfere with the trypaflavine reaction of other bacteria when the test is being employed as one of the criteria of roughness.

Summary

1 Suspensions of perfectly smooth cultures of *B typhosus* are agglutinated by trypaflavine. This reaction is closely linked up with the V₁ antigen of this organism.

2 Saline washings from sterile agar slopes, containing agar in colloidal form, are also flocculated by trypaflavine.

3 Colloidal agar, present in suspensions prepared by washing off agar cultures, modifies the trypaflavine agglutination of smooth and rough cultures of *B typhosus* in different ways.

4 The differentiation by the trypaflavine test of smooth and rough variants of *B typhosus* is possible only by eliminating the disturbing effect of the V₁ antigen, which most strains of typhoid bacilli possess.

REFERENCES

- ALFSSANDRINI, A, AND SABA 1931a *Ann Igien*, xli 29
TUCCI, M
" " " " 1931b *Ibid*, xli 852
CONSTANTINI, A 1935 *Giorn Batt e Imm*, xiv 352

man Clinic in Canton, and President of the staff of the Graham Hospital of the same city. He was married to Gladys Huff, of Atlanta, Illinois, in 1917. Their two

children are Eleanor Irene Coleman of New York City and Louise (Coleman) Scott, wife of Senator Albert Scott of Canton, Illinois.

LEGAL ADVISERS OF THE INTERNATIONAL COLLEGE OF SURGEONS

Mr. Alvin Edelman, attorney and counselor, the newly appointed legal adviser of the International College of Surgeons, is a forty-year-old Chicagoan. He received his preliminary education in the Chicago Public Schools and then attended Northwestern University in Evanston, Illinois, graduating with the degree of a Bachelor of Science in Law. He was a member of the Northwestern University Debating Team; was elected to Pi Eta Sigma, and to Phi Beta Kappa, the honorary scholastic fraternity. He was active in Inter-Fraternity Council work.

He studied law in the Northwestern University School of Law, from which he received the degree of Bachelor of Laws. He was Associate Editor of the *Illinois Law Review*, now known as the *Northwestern Law Review*. He is the author of a number of articles on law published in different legal periodicals.

Mr. Edelman is an active member of the Chicago Bar Association, serving most recently as a member of the Committee on Inquiry and the Committee on Medical Legal Relations. He has served as President of Tau Epsilon Rho, International Law Fraternity Alumni Association, and is a Past President of the Phi Epsilon Pi Fraternity Alumni Association. He is a member of the American Bar Association.

Mr. Edelman is Past Master of Isaac Cutter Lodge No. 1073, A.F. & A.M., a thirty-second degree Mason and a member of Medinah Shrine. He is a member of the Elks, holding an Honorary Life Membership, and last spring completed his term in

office as Exalted Ruler of Chicago Lodge No. 4, B.P.O. Elks.

He served in the United States Coast Guard Auxiliary as District Legal Officer for the Ninth United States Coast Guard Auxiliary District, and is presently Commander of Flotilla 22-8. He is active in a number of civic organizations, and has for several years served as Chairman of Zone 2 of the Lawyers' Division of the American National Red Cross.

Mr. Edelman is married and has three children, and is a resident of Glencoe, Illinois.

Mr. Roland Steiner, Advocate of the Geneva Bar, was recently appointed as the legal representative for the International College of Surgeons in Europe. Mr. Steiner was born in Geneva, Switzerland, on Jan. 1, 1918. His elementary and secondary education was secured in the city of his birth, where he had a scientific and classic training, graduating in 1936.

Mr. Steiner then entered the University of Geneva, where he pursued his studies in law. He earned a degree in law in 1942. He took graduate training at the University of Neuchâtel, in Switzerland, where he concentrated on the study of the economic and business sciences, in which he was awarded a degree in these subjects in 1943 and in law in 1944.

From the beginning of 1945 until the summer of 1946, he served in Paris as an official delegate of the International Red Cross Committee. Since the autumn of 1946, Mr. Steiner has been practicing law in Geneva.

Collaborating in the teaching program will be Drs. N. Lloret, F. Amoros, C. Ortoll, J. Montaner, P. Arque, A. Sitges, A. Modolell, M. Miserachs, A. Moliner, L. Torre Eleizegui, J. Jou and J. Raventos.

The course, devoted to theory and practice, is designed for graduate students with less than five years of professional practice. Only 15 students can be accommodated in the period of study beginning January 15 and ending May 15, 1957. Participating students will be considered as assistants of the Service and will be obliged to comply with the work schedule of the Service, which consists of:

9:00-9:30 Interpretation and comment on clinical cases

9:30-12:00 Practice in rooms, dispensaries, etc., on a rotation basis

In operating room sessions the students will be instructed in surgical technics applied to diseases of the digestive tract and will participate in operations under the direction of professors

12:00-1:00 Development of theoretic lessons

To secure a Certificate of Accreditation for Advanced Work, the following pre-requisites are essential:

1. Continuity of attendance
2. Demonstration of surgical aptitude, judged by the Director and Professors of the course
3. Advance payment of a registration fee of 500 pesetas, to cover teaching expenses

A contest will be held for two places for a year's residency in the Service for a year, starting January 15, 1957. The residents will receive room and maintenance in the Hospital and will present a work which can be rewarded by a medal.

For information, write immediately to:

Muy Iltre, Administracion del Hospital
Avenida de San Antonio Maria Claret, 167,
Barcelona, Spain

Vienna, Austria

Postgraduate courses in a number of different fields of surgery are offered annually at the University of Vienna. Information about the courses to be offered in 1957 and about enrollment in such graduate work may be secured by writing to:

Dr. M. Arthur Kline
Secretary, American Medical Society of Vienna
11 Universitätsstrasse
Vienna, Austria

Seminar Congress

The American Medical Society of Vienna

The annual Seminar Congress of the American Medical Society of Vienna, with which the International College of Surgeons is closely allied, is now available. Those interested in attending the Seminar

Congress are requested to write to the American Medical Society of Vienna, Universitätsstrasse 11, Vienna 1, Austria, for details and registration.

frequent intratesticular passage through rabbits 0.1 cc of desiccated testis suspended in saline was active to an end titre of 1:1,000,000 dilution. Rabbits 3 to 6 months old were lightly anaesthetised, the right cornea scarified with a sharp needle and 0.1 cc of a 1:10 broth suspension of vaccinia virus instilled into the conjunctival sac. The animals were killed at varying intervals and the cornea dissected out. Controls were also examined. Tissue was fixed in Helly's fluid and embedded in paraffin and sections 15-20 μ thick were cut and stained by Ford's modification (1934) of Mann's method.

The time factor in the formation of inclusion bodies

In nine 3-months-old rabbits so treated a chain of events could be traced from the first to the thirteenth day following vaccination. After 48 hours, typical Guarneri bodies were found in the cytoplasm of the corneal epithelial cells. These bodies were either homogeneous or granular in composition, the latter appearing to consist of an aggregation of highly refractile granules when viewed by dark-ground illumination (cf figs 4 and 5). Guarneri bodies increased in numbers up to the sixth day and measured from 2.5 to 3.3 μ in diameter. After this time the corneal epithelium was extensively denuded, making further study impossible.

Forty-eight hours after inoculation there were also observed small granules within the corneal epithelial cells. They measured from 0.34 to 0.68 μ and bore a resemblance to the granules described by Ungermann and Zuelzer, being diffusely scattered throughout the cytoplasm.

Similar changes were noted in the underlying substantia propria. From the first day onwards, many of the fibroblasts in the most superficial layers were seen to contain acidophilic granules (figs 2 and 3). With Mann's stain the cytoplasm of the fibroblast appeared light blue in colour and the nucleus deeply basophilic. The granules at first measured 0.42-1.67 μ in diameter. On the fourth day and later larger forms made their appearance, many being of similar dimensions to the true Guarneri body, i.e. 1.67-3.3 μ (figs 4 and 5). The maximum number of fibroblasts showing inclusions was observed from the fifth day onwards. With the progress of the infection marked proliferation of fibroblasts occurred and inclusion bodies made their appearance in the fibroblasts of the deeper layers. Clumps of precisely similar small granules lying free in the spaces of the substantia propria were also encountered. These increased in size and on the fifth day forms measuring up to 3.3 μ were observed.

Infiltration with polymorphs, exhibiting, by the method of staining used, marked eosinophil granularity, occurred from the first day. At first the cells were sharply circumscribed and of healthy appearance. Degeneration was not noticeable until the fourth day, after which many of the polymorphs had broken down, with liberation of their acidophilic granules. These tended to

Appearance of the normal cornea The corneæ of 25 normal rabbits varying in age from 2 to 4 months were cut and stained by Ford's modification of Mann's method. No acidophilic granules, inclusion bodies nor particles, large or small, were seen in either epithelium or substantia propria, nor were eosinophil polymorphs present (fig 1).

Effect of mechanical trauma The left corneæ of two rabbits were vigorously scarified with a hypodermic needle point and 0.5 c.c. of broth (similar to that used for the suspension of the vaccinia virus in the experiments already described) instilled into the conjunctival sac. The first animal was killed after 3 days the second after 5 days. No microscopic differences could be detected between the inoculated and the uninoculated eyes, and it was concluded that the trauma of scarification prior to inoculation did not produce any visible cellular reaction in the corneal tissues.

Effect of chemical irritation An endeavour was made to produce inflammation of the cornea by means of chemicals. Two rabbits were anaesthetised and one eye of each vigorously scarified with a needle and next painted with turpentine. After 3 days no visible differences could be detected between the eye treated with turpentine and the other. The application was accordingly renewed but no lesions resulted. Sections made 4 and 7 days after the re-application failed to show granules, inclusion bodies or polymorphs.

Pneumococcal keratitis A strain of type I pneumococcus virulent for mice was used and an acute keratitis was successfully produced in two rabbits by the fourth day after inoculation. Sections obtained 4 and 7 days after inoculation were stained as before. They showed that eosinophilic polymorphic infiltration of the cornea is present on the fourth day and still more notably on the seventh, when many of the cells show degeneration with liberation of their acidophilic granules. Such particles usually did not exceed 1.6μ in diameter and were approximately of the same size as the acidophilic granules occurring within unruptured polymorphs present in the cornea, circulating blood and bone marrow of the same animal when stained by identical methods. It should be recalled that the largest of the granules in vaccinal infection measured 3.3μ and were present from the fourth day onwards. No such large extracellular bodies are found in pneumococcal keratitis.

*Vaccinal keratitis induced in rabbits previously injected
with benzole*

Five rabbits were repeatedly injected with large doses of crude benzole, but only in one case was it found possible to depress the leucocyte count significantly. This rabbit, of 4 lb weight, was injected subcutaneously with daily doses of 4 c.c. of olive oil-

If the period of limitation relating to the giving of notice is prohibited or made void by any law controlling the contract hereof, such period shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

If the assured and/or insured person shall make any claim knowing the same to be false or fraudulent, as regards amount or other-

wise, such insurance shall become void and claim shall be forfeited.

The Malpractice Liability Insurance of the International College of Surgeons is administered by John L. Krause and Associates, 29 South LaSalle Street, Chicago 3, Illinois. Persons interested in this insurance are advised to write to this address.

GROUP PROTECTION AGAINST SUIT FOR MALPRACTICE

Major Insurance Coverage for Members of the United States Section International College of Surgeons

The ICS Group Malpractice Insurance Plan is well under way. Substantial savings are effected and as the participation increases, so does the success of the Plan.

In the past two months, several large Malpractice awards have been granted by the Courts, the top amount being \$290,000.00. Therefore, it is imperative that sufficient protection be maintained.

If you do not already have the ICS Malpractice Insurance Application on file for use when your present Malpractice Insurance expires, please address your inquiry to John L. Krause & Associates, 29 So. La Salle St., Chicago 3, Illinois.

Rate Schedule (Annual Premiums)

Limits of Liability	\$ 25,000 75,000	\$ 50,000 150,000	\$100,000 300,000
Alabama, Connecticut, Delaware, New Hampshire, Louisiana, Pennsylvania, Rhode Island, South Carolina, Texas	60.00	69.00	73.50
Massachusetts, Michigan, Nebraska, North Dakota, West Virginia, Hawaii	85.00	97.50	104.00
District of Columbia, Minnesota, Montana, Nevada, New York, Oregon, Washington, Wisconsin	125.00	144.00	153.00
California*	192.75	221.78	276.84
All others	97.50	112.00	119.50

*Certain fees and taxes must be paid by the insured in the State of California. The rates, therefore, have been adjusted as above.

the thirtieth of May, there begins a meeting of the New York and Canadian Sections at White Face Inn at Lake Placid, New York, and in early July, at the Balsams at Dixville Notch, New Hampshire, there will be held the traditional mid-summer meeting of the Eastern Region under the leadership of the Regent from Massa-

chusetts, Dr. Leopold Brodny of Boston.

Here are four pleasant breaks for the busy surgeon—guaranteed to relax the keyed up nervous system and unhardens the arteries. It would give me extreme pleasure to meet you, my brother surgeon, at each of these delightful assemblies.

IMPORTANT NOTICE TO ALL CONGRESS PARTICIPANTS

Those desiring their Congress presentations to appear later as articles in the Journal of the International College of Surgeons, please note:

1. A full copy of the manuscript, together with all illustrations, legends, tabular matter and bibliographic references, should be sent DIRECT to the Editorial Office, Journal of the International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois. Manuscripts so submitted will be promptly acknowledged and, on acceptance by the Editorial Board, published as soon after the Congress as possible. The Journal cannot be held responsible for loss, failure of acknowledgment, delay in publication or nonpublication of any manuscript, or any subsidiary material appertaining thereto, which has not been submitted through the official editorial channels.

2. Manuscripts may be submitted in advance of the Congress if desired. When this is done, they should be plainly marked with the name, place and date of the Congress concerned, to guard against premature publication.

3. Manuscripts delivered in person to Congress officials or others for press reportorial use only should be sent by the recipient to the Public Relations Bureau.

These requests are made not only to safeguard the Journal from error but in the best interests of our contributors. To make sure of prompt acknowledgment and efficient handling of your Congress presentation, please send it DIRECT to its ultimate destination!

infection The immune animals, however, showed no evidence of keratitis either naked-eye or microscopically only a few scanty extracellular granules were to be seen in the preparations examined, neither Guarnieri bodies nor fibroblastic inclusion bodies being present These results confirm the work of Sobernheim (1925)

Discussion

Following vaccination of the rabbit's cornea a characteristic series of pathological changes is induced, the main interest of which centres on the presence of acidophilic inclusions in the fibroblasts of the substantia propria We have failed to reproduce these inclusions in other varieties of keratitis, whether of mechanical, chemical or bacterial origin

The question whether they were acidophilic granules which had been extruded from degenerate polymorph leucocytes was considered, but parallel observations on pneumococcal keratitis showed that although eosinophilic infiltration and degeneration were present in this type of infection, there were no inclusion bodies in the fibroblasts Also the inclusion bodies were noted as early as 24 hours after vaccination of the cornea, long before polymorph degeneration had commenced

It is suggested therefore that these structures represent a phase in the growth of vaccinia virus in the rabbit's cornea, the more so in that they fail to appear in rabbits immunised against the disease Indeed, it is probable that they are colonies of the virus itself, for they have been shown to increase from 0.42 to 3.3 μ in diameter from the first to the fifth day following inoculation Critical microscopic scrutiny of these structures by direct and oblique illumination has revealed that they are granular in composition and closely resemble a mass of vaccinal elementary bodies This hypothesis is supported by data which show that the period of infection during which the maximum number of inclusion bodies is encountered, invariably coincides with the time at which the greatest number of elementary bodies are observed in the same tissue In conclusion, an experiment has been described in which it was shown that these inclusions were delicate structures that depended for the cohesion of their constituents on the integrity of the cell containing them

Conclusions

1 Some cytological features of vaccinal keratitis in the rabbit are described in detail from the first to the thirteenth day following vaccination

2 The presence of acidophilic inclusion bodies within fibroblasts is described These appear to be a specific feature of vaccinal



Dr. James P. Fleming, F.I.C.S., General Chairman.

FRIDAY, MAY 31, 1957

8:00 A.M.—REGISTRATION, WHITEFACE
INN LOBBY

Morning Session

Presiding: Victor A. Bacile, M.D., F.A.C.S.,
F.I.C.S., Poughkeepsie, N. Y.
Secretaries: George T. C. Way, M.D., F.A.C.S.,
F.I.C.S., Poughkeepsie, N. Y.
Louis D. Goldberg, F.I.C.S., Pough-
keepsie, N. Y.

8:30-9:30 A.M.—RADICAL RESECTION FOR
CARCINOMA OF THE STOMACH (3-D sur-
gical motion picture in color with sound)
Samuel F. Marshall, M.D., F.A.C.S., Lahey
Clinic, Boston, Mass.

9:30-10:15 A.M.—Panel—SURGICAL PROBLEMS
IN GASTRODUODENAL ULCER
Moderator: Joseph Alrich, M.D., F.A.C.S.,
F.I.C.S., New York, N. Y.
Raymond W. McNealy, M.D., F.A.C.S.,
F.I.C.S., Chicago, Illinois
Louis Perkel, M.D., F.A.C.P., Jersey City,
N. J.
C. B. Ripstein, M.D., F.A.C.S., F.I.C.S., New
York, N. Y.
Louis P. River, M.D., F.A.C.S., F.I.C.S., Oak
Park, Illinois
L. M. Russelot, M.D., F.A.C.S., New York,
N. Y.
Alfred Strauss, M.D., F.A.C.S., F.I.C.S.,
Chicago, Illinois

10:15-11:00 A.M. — Panel — DIAGNOSIS AND
TREATMENT OF MASSIVE HEMOR-
RHAGE FROM THE UPPER GASTROIN-
TESTINAL TRACT

Moderator: Earl Halligan, M.D., F.A.C.S.,
F.I.C.S., Jersey City, N. J.
Moses G. Behrend, M.D., F.A.C.S., F.I.C.S.,
Philadelphia, Pa.
Ralph R. Coffey, M.D., F.A.C.S., F.I.C.S.,
Kansas City, Mo.
John H. Garlock, M.D., F.A.C.S., F.I.C.S.,
New York, N. Y.
Louis Perkel, M.D., F.A.C.P., Jersey City,
N. J.
Alfred Strauss, M.D., F.A.C.S., F.I.C.S.,
Chicago, Illinois

11:00-11:50 A.M.—Panel—ACUTE SURGICAL
DISEASE OF THE ABDOMEN

Moderator: Arnold S. Jackson, M.D., F.A.C.S.,
F.I.C.S., Madison, Wisconsin
Ralph R. Coffey, M.D., F.A.C.S., F.I.C.S.,
Kansas City, Mo.
Henry P. Leis, Jr., M.D., F.A.C.S., F.I.C.S.,
New York, N. Y.
Merrill D. Lipsey, M.D., F.A.C.S., F.I.C.S.,
New York, N. Y.
Raymond W. McNealy, M.D., F.A.C.S.,
F.I.C.S., Chicago, Illinois



Dr. Max Michael Simon, F.A.C.S., F.I.C.S., Regent
for New York State Chapter and Co-Chairman of
Program Committee.



Left to right: Dr. A. N. Goldsmith (seated), Dr. McIntire, and Dr. Simon, who is presenting Dr. McIntire with a Christmas gift.

3:00-3:45 P.M.—Panel—PROBLEMS IN OBSTETRICS AND GYNECOLOGY

Moderator: Martin L. Stone, M.D., F.A.C.S., F.I.C.S., New York, N. Y.
 William C. Gillick, M.D., F.A.C.S., F.I.C.S., Niagara Falls, N. Y.
 Edward Kahn, M.D., F.I.C.S., Queens Village, N. Y.
 R. M. H. Power, M.D., F.A.C.S., F.I.C.S., Montreal, Canada
 John F. Rogers, M.D., F.A.C.S., F.I.C.S., Poughkeepsie, N. Y.
 Joseph F. Rooney, M.D., F.A.C.S., F.I.C.S., New York, N. Y.
 George J. Streat, M.D., F.A.C.S., F.I.C.S., Montreal, Canada

3:45-4:30 P.M.—Panel—DIFFICULT FRACTURE PROBLEMS

Moderator: Henry Milch, M.D., F.A.C.S., F.I.C.S., New York, N. Y.
 Otto C. Hudson, M.D., F.A.C.S., F.I.C.S., Hempstead, N. Y.
 Herbert A. Laage, M.D., F.A.C.S., F.I.C.S., New York, N. Y.
 Joseph E. Milgram, M.D., F.A.C.S., F.I.C.S., New York, N. Y.
 Anthony J. Pisani, M.D., F.A.C.S., F.I.C.S.,

New York, N. Y.
 Saul Ritchie, M.D., F.A.C.S., F.I.C.S., Kingston, N. Y.

4:30-4:40 P.M.—INTERMISSION

4:40-5:10 P.M.—Paper—SURGICAL TREATMENT OF UTERINE AND VAGINAL PROLAPSE (with colored film)

Charles Thom, M.D., F.A.C.S., F.I.C.S., Staten Island, N. Y.
Discussion: Victor A. Bacile, M.D., F.A.C.S., F.I.C.S., Poughkeepsie, N. Y.

SATURDAY, JUNE 1, 1957

Morning Session

Presiding: Joseph F. Rooney, M.D., F.A.C.S., F.I.C.S., New York, N. Y.
Secretaries: Benjamin Lipton, M.D., F.A.C.S., F.I.C.S., Poughkeepsie, N. Y.

Ch S.
 Hos-

8:00-8:30 A.M.—SURGICAL EXPLORATION FOR OBSCURE MASSIVE UPPER GASTROINTESTINAL HEMORRHAGE (colored film)

J. E. Dunphy, M.D., F.A.C.S., Boston, Mass.,

INDEX OF SPEAKERS

ALVICH, JOSEPH, M.D., F.A.C.S., F.I.C.S., New York, N. Y.

Director of Surgery, St. Francis and Mother Cabrini Memorial Hospitals; Visiting, Fordham Hospital.

ANGRIST, ALFRED, M.D., F.C.A.P., F.I.C.S., Jamaica, Long Island.

Professor of Pathology, Albert Einstein Medical School; Chief Medical Examiner, Borough of Queens.

AYERS, HORACE E., M.D., F.A.C.S., F.I.C.S., New York, N. Y.

Vice President, United States Section of the International College of Surgeons and Regent of the State of New York; Professor, New York Medical College, Attending, Flower-Fifth Avenue Hospital, Consultant, Metropolitan Hospital (New York City); Richmond Memorial Hospital (Staten Island); William McKinley Memorial Hospital (Trenton, N. J.); St. Francis Hospital (Poughkeepsie, N. Y.).

BABBAGE, DEAN E., M.D., Buffalo, N. Y.
Chairman, Department of Anesthesiology, Millard Fillmore Hospital; Clinical Professor and Chairman, Department of Anesthesiology, University of Buffalo; Chief Anesthesiologist, Meyer Memorial Hospital; Consultant in Anesthesiology, Veterans Administration Hospital.

BACHLE, VICTOR, M.D., F.A.C.S., F.I.C.S., Poughkeepsie, N. Y.

Obst., Vassar Brothers Hospital; Sr. Gyn and Director of Obstetrics, St. Francis Hospital.

BEHREND, MOSES G., M.D., F.A.C.S., F.I.C.S., Philadelphia, Pa.

Associate in Surgery, Jefferson Medical College; Attending Thoracic Surgeon, St. Agnes Hospital; Consultant, Albert Einstein Medical Center (Philadelphia, Pa.).

BERNSTEIN, DAVID, M.D., F.I.C.S., F.C.C.P., D.D.L., New York, N. Y.

Associate Clinical Professor of Otorhinolaryngology, New York University Post-Graduate Medical School, As-

sociate Attending Otolaryngologist Bellevue and University Hospitals (New York City).

BINGHAM, D. L. C., M.D., F.R.C.S., (Ed & C), F.A.C.S., F.I.C.S., Kingston, Canada.

Kingston General Hospital, Kingston, Ontario; Professor of Surgery, Queen's University Medical College; Director of Surgery, Queen's General Hospital; Consultant, Hotel Dieu and St. Mary's of the Lake Hospitals.

BDHROD, MILTON G., M.D., F.C.A.P., D.P.A., Rochester, N. Y.

Pathologist and Director of the Laboratories of the Rochester General Hospital and the North Side Division of the Rochester General Hospital.

BRDDNY, MAX L., M.D., F.A.C.S., F.I.C.S., Boston, Mass.

Diplomate, American Board of Urologic Surgery; Assistant Urologist, Boston Floating Hospital; Associate in Urology, Beth Israel Hospital; Junior Surgical Urologist, Mt. Auburn Hospital, Visiting Urologist, Boston State Hospital; Associate Staff Member, Joseph H. Pratt Diagnostic Hospital; Consulting Urologist, Milford Hospital; Assistant Clinical Professor of Urology, Tufts Medical School.

BURLO, GEORGE M., M.D., New York, N. Y.

Director, Department of Electroencephalography, Bellevue Hospital, (1st Neurosurgical N. Y. U. Division).

BURR, R. C., M.D., Kingston, Canada.

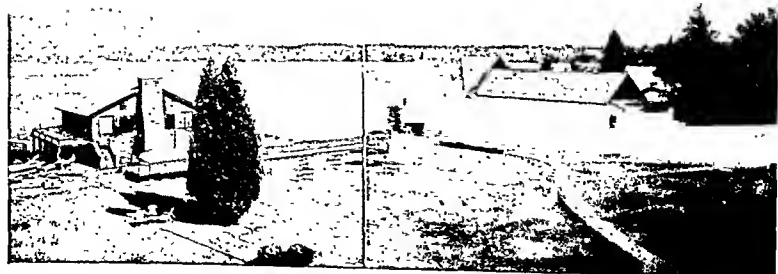
Chief of the Ontario Cancer Foundation, Kingston Clinic, Kingston University and Hospital.

BURT, CON AMORE V., M.D., F.A.C.S., F.I.C.S., New York, N. Y.

Attending Surgeon, Vanderbilt Clinic and St. Clare's Hospital; Assistant Attending, Presbyterian Hospital; Consulting Proctologist, Hackensack Hospital (Hackensack, N. J.).

CLAYTON, SAM, M.D., D.O.L., D.I.C.S., F.I.C.S., New York, N. Y.

American Academy Ophthalmology and Otolaryngology, Associate Otolaryngologist, Hillside; Associate Oto-



Another scene at Lake Placid.

MUSSID, JOHN G., M.D., F.I.C.S., D.I.B.S., Brooklyn, N. Y.
Associate Professor of
York Medical
Gynecologist at
Fifth Avenue

NAGAMATSU, GEORGE R., M.D., F.A.C.S., F.I.C.S., New York, N. Y.
Diplomate of the American Board of Urology; Professor of Urology, New York Medical College.

NASH, C. STEWART, M.D., F.A.C.S., F.I.C.S., Rochester, N. Y.
Instructor, University of Rochester School of Medicine (Rochester, N. Y.).

NEGRIN, JUAN JR., M.D., F.I.C.S., New York, N. Y.
Assistant Professor of Surgery, New York Metropolitan Medical School and King's Park
Bellevue and Lenox

NDBLE, ALLEN B., M.D., Montreal, Canada.
Assistant Professor of Anesthesiology, McGill University; Chief, Department of Anesthesia, Royal Victoria Hospital (Montreal, Canada).

PALMER, SECORD, M.D., D.P.H., Brooklyn, N. Y.
Assistant Director, Brooklyn State Hospital.

PARLOW, ALLAN L., M.D., Rochester, N. Y.
Diplomate of the American Board of Urology, Assistant Professor of Urology (Rochester Medical School).

PERKEL, LOUIS, M.D., F.A.C.P., Jersey City, N. J.
Professor of Gastroenterology, Seton Hall Medical College (Jersey City, N. J.); Attending Gastro-Enterologist, Jersey City Medical Center.

PISANI, ARTHUR J., M.D., F.A.C.S., F.I.C.S., New York, N. Y.
Chief Orthopedic Surgeon, St. Vincent's Hospital (New York City); Associate Orthopedic Surgeon, Bellevue.

PDWER, DAVID J., M.D., F.R.C.P. (C), F.A.R.C.S. (ENG.) Montreal, Canada.
Sessional Lecturer of Anatomy, McGill, Assistant, St. Mary's Memorial Hospital.

PDWER, DAVID J., M.D., F.R.C.P. (C), F.A.R.C.S. (END.) Montreal, Canada.

RECID, PARFIRID M., M.D., F.P.C.S., F.A.C.S., F.I.C.S., Manila, Philippines.
Regent, Philippine College of Surgeons.

RAINEY, JOHN J., M.D., F.A.C.S., F.I.C.S., Troy, N. Y.
Consultant Otolaryngologist, St. Mary's McEllen Memorial.

RIPSTEIN, C. B., M.D., F.A.C.S., F.I.C.S., Brooklyn, N. Y.
Professor of Surgery, Einstein Medical College (New York City).

RITCHIE, SAUL, M.D., F.A.C.S., F.I.C.S., Kingston, N. Y.
Attending Orthopedic Surgeon, Benedictine, Kingston and Ulster Co. Tuberculosis Hospitals (Kingston); Consultant Northern Dutchess Health Center (Rhinebeck); Memorial of Greene County (Catskill); Margaretville Hospital (Margaretville); Maimonides Hospital (Liberty); Civilian Consultant, Station Hospital (West Point 1943).

RIVER, LOUIS P., M.D., F.A.C.S., F.I.C.S., Oak Park, Ill.
Diplomate, American Board of Surgery, Clinical Professor of Surgery, Stritch School of Medicine of Loyola University; Professor of Surgery, Cook County Post Graduate Medical School.

ROGERS, JOHN F., M.D., F.A.C.S., F.I.C.S., Poughkeepsie, N. Y.
Diplomate, American Board of Obstetrics and Gynecology; Attending Gynecologist and Obstetrician, St. Francis and Vassar Brothers Hospitals (Poughkeepsie); Consulting Obstetrician and Gynecologist, Northern Dutchess Hospital (Rhinebeck).

ROONEY, JOSEPH F., M.D., F.A.C.S., F.I.C.S., D.I.C.S., New York, N. Y.
President-Elect, New York State Section of International College of Surgeons; Instructor, New York Medical College; Assistant Attending Gynecologist, Flower-Fifth Avenue Hospital.

ROSSER, CURTICE, M.D., F.A.C.S., F.I.C.S., Dallas, Texas.
Diplomate, American Board of Proctology; Surgery; Professor and Head, Department of Proctology, Southwestern Medical College; Chief, Proctology Staff City-County Hospitals; Proctologist, Baylor University Hospital; President, United States Section of International College of Surgeons.

RUSSELL, L. M., M.D., F.A.C.S., New York, N. Y.
Clinical Professor of Surgery, New York University Medical College; Director of Surgery, St. Vincent's Hospital (New York City).

SAUER, JOHN J., M.D., F.A.C.S., F.I.C.S., New York, N. Y.
Assistant Ophthalmologist, Lenox Hill; Consulting Ophthalmologist, U. S. Public Health Service (New York City) and St. Francis (Port Jervis); Ophthalmologist, Willard Parker and French Hospitals.

SCHEER, HENRY M., M.D., F.A.C.S., F.I.C.S., New York, N. Y.
Clinical Professor, New York Polyclinic Hospital; Consultant, Gouverneur Hospital.

SCHEER, ALAN A., M.D., F.A.C.S., F.I.C.S., D.O.L., New York, N. Y.
Assistant Attending Surgeon, Manhattan E.E.N.T.; Assistant Surgeon, Otolaryngology, Assistant Clinical Professor of Otolaryngology, New York University Medical School.

SCHUMACHER, GEORGE, M.D., F.I.C.S., New York, N. Y.
Professor, Neurology, Vermont University Medical School; Formerly Director of Neurological Service, Bellevue Hospital, 2nd Division, Cornell University Medical School.

SEED, LINDON, M.D., F.I.C.S., Chicago, Ill.
Diplomate, American Board of Surgery; Associate Professor of Surgery, University of Illinois Medical School, Surgical Staff, Oak Park Hospital.

SIMON, MAX MICHAEL, M.D., F.A.C.S., F.I.C.S., Poughkeepsie, N. Y.
Attending Surgeon, St. Francis Hospital; Consulting Surgeon, Highland and Matteawan Hospitals (Deacon); President, New York State Section of International College of Surgeons.

SIMON, SAMUEL, M.D., F.A.C.S., F.I.C.S., Poughkeepsie, N. Y.
Diplomate of the American Board of Urology; Director, Urology, Vassar Brothers Hospital; Associate Attending Urologist, St. Francis Hospital; Attending Urologist, Hudson River State Hospital, Consulting Urologist, Northern Dutchess Health Center and Highland Hospital.

STONE, MARTIN L., M.D., F.A.C.S., F.I.C.S., New York, N. Y.
Professor and Director, Department of Obstetrics and Gynecology, New York Medical College and Flower-Fifth Avenue Hospitals (New York City).

STRAUSS, ALFRED, M.D., F.A.C.S., F.I.C.S., Chicago, Ill.
Attending Surgeon, Michael Reese and Mt. Sinai Hospitals; Attending Surgeon, Franklin Blvd. Community and Louis A. Weiss Memorial Hospitals (1922).

STREIB, GEORGE J., M.D., F.A.C.S., F.I.C.S., Montreal, Canada.
Assistant Professor, McGill; Department Director, Jewish Hospital.

TARDIF, ISIDORE, M.D., F.A.C.S., F.I.C.S., New York, N. Y.
Director of Surgery, St. Vincent's Hospital, New York City.

TAUSEND, N. Y.
Director of Surgery, St. Vincent's Hospital, New York City.

THEIS, FRANKLYN B., M.D., F.A.C.S., F.I.C.S., D.O., Nyack, N. Y.
Director, E.E.N.T., Nyack, N. Y.

THOMPSON, CHARLES, M.D., F.A.C.S., F.I.C.S., Staten Island, N. Y.
Diplomate, American Board of Obstetrics and Gynecology; Director of Obstetrics and Gynecology, St. Vincent's Hospital (Staten Island).

THOMPSON, SAMUEL A., M.D., F.A.C.S., F.I.C.S., D.A.B., New York, N. Y.
Associate Professor, New York Medical College (New York City); Director, Thoracic Surgery Service, Metropolitan Hospital (New York City); Municipal Sanitarium (Otsville); Attending Surgeon, St. Clare's St. Anthony's Riker's Island Hospitals; Consultant, St. Joseph's Hospital for Diseases of the Chest (New York City); Paterson General Hospital (Paterson, N. J. 1929).

THORPE, MAX, M.D., F.S.C.D., L.L.D., F.B.C.S., F.I.C.S., F.R.C.S. (Hon.) F.R.S.M., Chicago, Ill.
Founder and General Secretary, International College of Surgeons; Professor of Surgery, Cook County Graduate School of Medicine; Surgeon-in-Chief, American Hospital (Chicago). SPEAKER AT THE BANQUET.

TOOMEY, JAMES J., M.D., F.A.C.S., F.I.C.S., Poughkeepsie, N. Y.
Diplomate of the American Board of Urology; Director, Surgery and Urology, St. Francis Hospital, Consultant, Harlem Valley State Hospital (Wingdale); Hudson River State and Vassar Brothers Hospitals (Poughkeepsie).

TRAVIS, WILLIS, M.D., F.I.C.S., Poughkeepsie, N. Y.
Associate Attending Ophthalmologist, St. Francis and Vassar Brothers Hospitals.

WAULINGFORD, ARTHUR J., M.D., F.A.C.S., F.I.C.S., Albany, N. Y.
Professor of Gynecology and Director of Obstetrics and Gynecology, Albany Medical College and Hospital; Gynecologist, Brady Hospital, Chief Gynecologist, A

Stains dissolved in strong alcohol must consequently be used with great care

Mount in either glycerine jelly or Farrant's medium, care should be taken to free sections from bubbles as far as possible. This is assisted by warming the coverslip before covering. Farrant's medium is easier to use, but glycerine jelly is less harmful to the section. We have had no success with any of the methods suggested for mounting in balsam, even using carbol-xylol for clearing. Drying on the slide in the incubator (Adrian) usually shrinks the section beyond hope of recovery. Ringing is advisable, and essential if the slides are to be kept for any length of time, we suggest Apathy's mounting medium or cellulose paint for the purpose. The counterstain always dissolves out in time, but the section can be recovered by soaking off the mount in warm water. The glycerine jelly can be hardened into a permanent mount by exposure to formaldehyde vapour.

The advantages of the method are —(1) speed—a satisfactory section can be produced if necessary in nine days, (2) no dehydration, with correspondingly little shrinkage, (3) consistently thin sections, serial if required, (4) cheapness—no new apparatus and no alcohol are required, (5) faded sections can be restained with ease, (6) sections can be stained for fat.

The disadvantages are —(1) the sections cannot be heated strongly or treated with strong acids, alkalis or alcohol, (2) the counterstain fades, (3) the sections must be mounted in glycerine jelly or Farrant's medium.

My thanks are due to Dr G. R. Cameron, who gave me much help and encouragement, and supplied me with human material.

REFERENCES

- | | |
|-----------------|---|
| ADRIAN, W. | 1922/23 <i>Cbl allg Path</i> , xxviii 201 |
| GASKILL, J. F. | 1912/13 <i>this Journal</i> , xvii 58 |
| GRATE, S. | 1916 <i>Monch med Wschr</i> , lxi 1482 |
| " | 1918 <i>Klin Mbl f Augenheilk</i> , lxi 556 |
| HAMILTON, D. J. | 1880 <i>A textbook of pathology</i> , vol 1, London, p 61 |
| LEFF, A. BOLLES | 1928 <i>The microtomeist's vade mecum</i> , 9th ed, London, p 96 |
| NICOLAS, A. | 1806 <i>Bibliogr Anat</i> , Paris, p 274 |
| SCHMOLL, G. | 1934 <i>Die pathologisch histologischen Untersuchungsmethoden</i> , 16th ed, Berlin, p 91 |
| SOLTA, J. | 1884 <i>Quart J Micros Sci</i> , xxiv 163 |

GREAT LAKES REGIONAL DIVISION AND INDIANA STATE CHAPTER TO MEET AT FRENCH LICK IN APRIL

Under the General Chairmanship of Dr. J. Andrew Bowen, F.A.C.S., F.I.C.S., D.A.B., Regent of Kentucky, the Great Lakes Regional Division of the United States Section, International College of Surgeons, will combine with the Indiana State Chapter in a meeting at French Lick, Indiana, April 7-10, 1957, at the French Lick Sheraton Hotel. Current medical and surgical problems and progress will be discussed by men of national and international reputation. In addition to the scientific sessions, social and sports activities will be offered.

SCHEDULE OF ACTIVITIES

Monday, April 8

Scientific Program 9:00 a.m.-1:00 p.m.

Ladies:

Tour of West Baden College

Tour of hotel gardens and hothouse

Luncheon, Regents 1:15 p.m.

Tuesday, April 9

Scientific Program 9:00 a.m.-1:00 p.m.

Ladies:

Luncheon and Style Show 12:30 p.m.

Luncheon:

Members of Indiana State Chapter

1:15 p.m.

Social Hour

Courtesy of Eli Lilly & Company,

Indianapolis, Indiana

Banquet 7:30 p.m.

(Toastmaster, Dr. Ross T. McIntire;

guest speaker to be announced)

Wednesday, April 10

Scientific Program 9:00 a.m.-1:00 p.m.

Ladies:

Bridge tournament

Shuffleboard tournament

SCIENTIFIC PROGRAM

Monday, April 8, 1957

Invocation 8:45-9:00 a.m.

Greetings:

J. Andrew Bowen, M.D., General Chairman

Ross T. McIntire, M.D., F.A.C.S., F.I.C.S.,

D.A.B., Executive Director, International

College of Surgeons

Max Thorek, M.D., Sc.D., LL.D., F.B.C.S. (Hon.), F.I.C.S. (Hon.), F.P.C.S. (Hon.), F.R.S.M. (Eng.), International Secretary General, International College of Surgeons

Presiding:

Leon Gray, M.D., F.I.C.S., President, Indiana State Chapter, Martinsville, Indiana

Secretary:

Ben A. Reid, M.D., F.I.C.S.

Louisville, Kentucky

Vesicorectostomy—Six Cases. 9:00-9:20 a.m.

John J. Robbins, M.D., Board of Eligible Urology, Instructor of Surgery, Department of Urology, University of Louisville School of Medicine, Louisville, Kentucky

Local Skin Flaps for Lesions of

Nose and Upper Lip. 9:20-9:40 a.m.

J. Thomas Giannini, M.D., F.A.C.S., D.A.B., Assistant Professor of Surgery, Department of Plastic Surgery, University of Louisville School of Medicine, Louisville, Kentucky

Colles Fracture 9:40-10:00 a.m.

Harvey W. Sigmond, M.D., F.A.C.S., F.I.C.S., D.A.B., Assistant Professor, Orthopedic Surgery, Indiana University Medical School, Indianapolis, Indiana

Tube Feeding with Natural

Foods 10:00-10:20 a.m.

James Barron, M.D., F.A.C.S., D.A.B., Associate Surgeon, Division of General Surgery, Henry Ford Hospital, Detroit, Michigan

Head Pain Due to Tortuous

Basilar Artery 10:20-10:40 a.m.

Gordon L. Smiley, M.D., D.A.B., Louisville, Kentucky

Intermission 10:40-11:00 a.m.

Recent Developments in Cardiac

Surgery 11:00-11:20 a.m.

J. Ray Bryant, M.D., F.A.C.S., D.A.B., Louisville, Kentucky

Blood Volume and Chronic

Shock 11:20-11:40 a.m.

John E. Krueger, M.D., M.A., Attending Anesthesiologist, St. Joseph's Hospital, Healthwin Hospital, Northern Indiana Children's Hospital, South Bend, Indiana

Evaluation of Early Operation for

Myelomeningocele 11:40-12:00 M.

Robert F. Heimbürger, M.D., D.A.B., Associate Professor of Surgery, Division of Neurosurgery, Indiana University Medical School, Indianapolis, Indiana

Panel

Diagnostic Problems in

Urology 12:00-1:00 p.m.

Moderator: J. Andrew Bowen, M.D., F.A.C.S., F.I.C.S., D.A.B., Professor of Urology, Uni-

these were characterised by proliferation of ectoderm, mononuclear and leucocytic infiltration with extensive oedema of the underlying mesoderm, and low papillary proliferation of the endoderm. Some necrosis was noted but inclusions were rarely seen. Membranes showing these lesions were highly infective for experimental animals.

Using the same technique, Burnet (1934) cultivated the virus of laryngo tracheitis. The infection produced macroscopic, double zoned lesions with much oedema. Microscopically he observed patches of ectodermal proliferation with oedema and fibroblastic infiltration of the mesoderm. As the lesion developed, the affected ectodermal cells underwent vacuolation and necrosis and showed intranuclear inclusions. Material from the third and seventh egg generations was infective for chickens.

Brandly (1935) obtained practically the same results and was able to carry the virus of laryngo tracheitis through 25 egg passages.

Covell (1934/35) and Higbie and Howitt (1935) grew the virus of equine encephalomyelitis in incubated eggs. Oedema of the chorio allantoic membrane appeared within three to six hours after inoculation. As the lesion progressed, the membrane became opaque, the blood vessels being practically obliterated. Ectodermal proliferation with eventual necrosis was observed. No inclusions were found in the cells of the infected membranes, but intranuclear inclusions were regularly demonstrated in the embryonic nerve cells of various regions of the brain. Third and fourth egg generation membranes were found infective for guinea pigs and titration of the virus at varying periods following membrane inoculation showed definite evidence of multiplication.

Burnet and Ferry (1934) infected eggs with fowl plague and Newcastle disease of fowls. The Newcastle disease virus produced macroscopic changes in the membrane. Microscopically these consisted essentially of ectodermal proliferation, vacuolation and necrosis, with the presence of sharply defined, acidophilic, ectodermal cytoplasmic inclusions surrounded by vacuoles. Oedema of the mesoderm was sometimes encountered, accumulations of inflammatory cells and extravasated red blood cells were frequently noted and slight endodermal proliferation with some cell vacuolation was occasionally seen. The virus of fowl plague did not produce macroscopic lesions, but microscopically the infected membranes were oedematous with almost complete absence of the ectoderm. Newcastle disease caused death of the embryos in 30 to 48 hours, while fowl plague killed them in 14 to 18 hours. With both infections the membranes, as well as various parts of the embryos, were found to contain virus. The authors make no mention of the number of egg passages or whether possible infectivity of the inoculated membranes for hens was determined.

Burnet and Galloway (1934) were able to infect chick embryos with the virus of vesicular stomatitis. Some strains killed the chicks in 24 to 48 hours with little or no changes in the membrane. Others produced infection with patches of ectodermal proliferation, variable inflammatory reaction, oedema and new blood vessel formation, the ectoderm usually showing degeneration with ballooning and necrosis of its cells. Inclusions were not noted. The virus was carried through 10 successive egg passages in one instance, and there was apparently an increase in its virulence for chick embryos during such transfers.

Galloway and Elford (1935) were able to separate and identify the viruses in mixtures containing the causal agents of vesicular stomatitis and foot and mouth disease by means of filtration and egg inoculation. The virus of foot and mouth disease was found to have no effect on the egg membranes.

Surgical Management of

Draining Nipple12:20-12:40 p.m.

George N. Bates, M.D., F.A.C.S., F.I.C.S.,
D.A.B., Active Surgical Staff, St. Vincent,
St. Charles and Maumee Valley Hospitals;
Courtesy Surgical Staff, Mercy and Toledo
Hospitals, Toledo, Ohio

Incubation Period in Rhinogenic

Carcinoma12:40-1:00 p.m.

Edward C. Lawless, M.D., Columbus, Ohio

Wednesday, April 10, 1957

Presiding:

J. Duane Miller, M.D., F.A.C.S., F.I.C.S.,
D.A.B., Regent of Michigan, Grand Rapids,
Michigan.

Secretary:

Gilman D. Kirk, M.D., F.A.C.S., F.I.C.S.,
D.A.B., Regent of Ohio, Columbus, Ohio

Tumors of the Neck9:00-9:20 a.m.

Arnold S. Jackson, M.D., F.A.C.S., F.I.C.S.,
D.A.B., Director, Jackson Clinic, Madison,
Wisconsin

Management of Subcapital Fractures of the

Hip by Transfixion9:20-9:40 a.m.

Frederick James Krueger, M.D., F.A.C.S.,
F.I.C.S., D.A.B., Assistant Clinical Professor,
Orthopedic Surgery, Marquette University,
Milwaukee, Wisconsin

Benign Neoplasms of the

Stomach9:40-10:00 a.m.

Edmund W. Schacht, M.D., F.A.C.S., F.I.C.S.,
Chairman, Surgical Service, St. Luke's Hos-
pital, Racine, Wisconsin

Fractures of the Ankle10:00-10:20 a.m.

George J. Garceau, M.D., F.I.C.S., D.A.B.,
Professor and Chairman, Department of
Orthopedic Surgery, Indiana University Med-
ical School, Indianapolis, Indiana

A Method of Surgical Treatment of

Urethral Stricture Not Amenable

to Dilatation10:20-10:40 a.m.

Avrom M. Isaacs, M.D., F.A.C.S., D.A.B.,
Clinical Instructor of Surgery, Department
of Urology, University of Louisville School
of Medicine, Louisville, Kentucky

Intermission10:40-11:00 a.m.

Panel

Thyroid Diseases11:00-12:00 M.

Moderator: Arnold S. Jackson, M.D., F.A.C.S.,
F.I.C.S., D.A.B., Director, Jackson Clinic,
Madison, Wisconsin

William O. Johnson, M.D., F.A.C.S., D.A.B.,
Professor of Gynecology and Head of the
Combined Departments of Gynecology and
Obstetrics, University of Louisville School
of Medicine, Louisville, Kentucky

Claude J. Hunt, M.D., F.A.C.S., F.I.C.S.,
D.A.B., Former Chairman, Research and

Kansas City Municipal Hospitals; Surgeon,
Research Hospital, St. Mary's Hospital,
Menorah Hospital, Surgical Section Research
Clinic; Chairman of Trustees, United States
Section, International College of Surgeons,
Kansas City, Missouri

Lindon Seid, M.D., F.I.C.S., D.A.B., Clinical
Associate Professor of Surgery, University
of Illinois College of Medicine; Surgical Staff
and Director of Isotope Laboratories, Augus-
tana Hospital, Chicago, Illinois

The Complications of Cataract Surgery

and Their Management12:00-12:20 p.m.

Richard C. Troutman, M.D., F.A.C.S., D.A.B.,
Professor of Ophthalmology, Department of
Surgery, State University of New York,
Brooklyn, New York

Menstruation: Its Physiology and

Abnormalities12:20-12:40 p.m.

Gilbert F. Douglas, M.D., F.A.C.S., F.I.C.S.,
D.A.B., Associate Professor of Gynecology,
Department of Gynecology, Medical College
of Alabama, Birmingham, Alabama

Surgical Treatment of Inguinal Hernia,

with Particular Reference to

Recurrences12:40-1:00 p.m.

W. M. McMillan, M.D., F.A.C.S., F.I.C.S.,
D.A.B., Professor of Surgery, Cook County
Graduate School; Assistant Professor of Sur-
gery, Northwestern University, Chicago, Illi-
nois

The General Chairmen of the Woman's

Auxiliary for the French Lick meeting are

Mrs. Arnold S. Jackson, Madison, Wisconsin;

Mrs. Leon Gray, Martinsville, Indiana, and

Mrs. Elbert L. Dennis and Mrs. Karl Winter,

Louisville, Kentucky. The Co-Chairmen are

Mrs. Ben A. Reid, Mrs. J. Andrew Bowen and

Mrs. Joseph C. Ray, Louisville, Kentucky;

Mrs. Paul Haley, South Bend, Indiana, and

Mrs. George Garceau, Mrs. Phillip Holland,

Mrs. Eugene Newland and Mrs. Simon Reiser,

Indianapolis, Indiana.

A cordial invitation is extended to mem-
bers of the surgical and allied professions,

their families and guests to attend.

Advance registration Sunday, April 7

in the Lobby from 10:00 a.m. to 12:00

noon and from 2:00 p.m. to 4:00 p.m. Reg-
istration fee \$5.00 for members and visit-
ing physicians. No charge for residents,

interns, nurses and the Military.

Women's registration in the Lobby. Fee

\$5.00.

of lesion would probably appear as a central nodule if small windows (4-5 mm in diameter) were used. They noted little change in the ectodermal layer, slight mesodermal oedema, but intense endodermal hypertrophy with cell vacuolation and intracytoplasmic inclusion like bodies. The general histological appearance was very similar to that reported for some of the "virus reactions" of this membrane, and the acidophilic cell inclusions were similar to those considered by various authors as specific "virus inclusions". Smith, while cultivating the virus of influenza on the chorio-allantoic membrane, observed "lesions" which, however, were quite inconsistent "and have, moreover, been seen in membranes inoculated with stock broth or saline". They consisted of focal thickenings—flat, opaque patches with ground-glass appearance, or small heaped up nodules. Microscopically these proved to be focal proliferations of the ectoderm or endoderm or both, with slight increase in keratinisation, and slight infiltration of the mesoderm with polymorphonuclear and mononuclear leucocytes. He found that "membranes possessing an absolutely normal appearance have proved just as infective as those with lesions," and concludes that "finer methods are needed before the reaction between a virus and host cell can be demonstrated."

Experimental observations

During an experimental attempt to cultivate viruses on the chorio-allantoic membrane of developing eggs, series of control eggs which had not been opened were used along with controls inoculated with such materials as sterile broth and physiological salt solution, and various virus-containing materials in amounts of 0.05 to 0.1 c.c. (table). The eggs came from different sources of supply and from all batches inoculated and uninoculated eggs were allowed to hatch. It was soon observed that at certain periods in the development of the chick, the chorio-allantoic membrane showed extremely thickened areas which had the appearance of the oedematous changes and other macroscopic lesions reported in the literature as the result of virus activity, and that such changes were independent of inoculated material, the only differences noted in the inoculated and uninoculated groups resulting from trauma incident to preparing the windows. The inoculum was introduced on the chorio-allantoic membrane immediately beneath the shell by means of a dental drill equipped with a carborundum disc, rigid aseptic precautions being observed throughout the procedure. Microscopic examination showed histological pictures markedly similar to those reported for experimental virus lesions. These were as follows:

- 1 Mesodermal oedema and proliferation, not associated with the large blood vessels, and without proliferation, of either epithelial layers (fig. 1). The areas so involved varied from approximately 0.02 to several mm in diameter.
- 2 Oedema or proliferation of the mesoderm with proliferation of the ectoderm and occasional hypertrophy of the endoderm (fig. 2). Some of these

Woman's Auxiliary

United States and Canadian Sections, International College of Surgeons

REPORT OF PROGRESS



Mrs. Clifton L. Dance

Our committees have been diligently at work since the last meeting of the Board of Directors, and I take this opportunity to acquaint you with the personnel and work of our committees and our officers.

Ladies' Entertainment Committee, Mrs. Clement L. Martin, Chairman.—Mrs. Martin is already at work, planning the entertainment for the next annual Congress. In a great metropolis like Chicago, plans and reservations must be made far in advance. With Mrs. Martin at the helm, we may be sure of delightful surprises.

Constitution and By-Laws Committee, Mrs. DeLoise H. Downey, Chairman.—Mrs. Downey, who is richly endowed for this task, reports good progress. The work requires vision to see ahead for the steady growth of the Auxiliary and a balanced judgment for the practical. Each point must be considered and then reconsidered from a point of law.

Historian, Mrs. Henry W. Meyerding.—Mrs. Meyerding is particularly well qualified for the important post of recording for posterity. She is a charter member of the Woman's Auxiliary. Her husband is a past president of the United States Section of the International College of Surgeons, and both are conversant with every important event in the history of the College.

Membership Committee, Mrs. Floyd E. Keir, Chairman.—This is a year-round job,

and we are fortunate in having for our chairman Mrs. Keir, who attends a good many of the Regional Meetings and often acts as our Representative at Large.

Memorial Fund Committee, Mrs. Donald L. Dickerson, Chairman.—Mrs. Dickerson is also a charter member and is a constant, devoted worker for the Memorial Fund among her many other activities.

Public Relations, Mrs. Charles W. Weigel.—This is a post that requires a dash of imagination, as our Auxiliary is still in its infancy. We are, however, growing fast, and this growth will furnish really worth-while material in due time.

Printing Committee, Mrs. Jerome J. Moses, Chairman.—Mrs. Moses has the double duty of placing orders for all printed matter and then seeing that the proper committees and officers are supplied with the printed matter they need.

Hall of Fame and School of the History of Surgery, Mrs. Chester W. Trowbridge, Chairman.—This is a comparatively new committee, appointed with the advent of the School of the History of Surgery. This school, unique in the annals of surgery, is located in the International Surgeons' Hall of Fame and offers a series of lectures by outstanding authorities and scholars in surgical history. Mrs. Trowbridge and her committee serve as hostesses at these lectures, and as might have been expected of such a genuinely hospitable person, Mrs. Trowbridge has come up with a set of recommendations to make the lectures more accessible and comfortable for the audience.

Archives Committee.—This committee is in the process of being set up. A chairman and cabinet will be appointed.

Woman's Auxiliary

United States and Canadian Sections, International College of Surgeons

REPORT OF PROGRESS



Mrs. Clifton L. Dance

Our committees have been diligently at work since the last meeting of the Board of Directors, and I take this opportunity to acquaint you with the personnel and work of our committees and our officers.

Ladies' Entertainment Committee,

Mrs. Clement L. Martin, Chairman.—Mrs. Martin is already at work, planning the entertainment for the next annual Congress. In a great metropolis like Chicago, plans and reservations must be made far in advance. With Mrs. Martin at the helm, we may be sure of delightful surprises.

Constitution and By-Laws Committee, Mrs. DeLoise H. Downey, Chairman.—Mrs. Downey, who is richly endowed for this task, reports good progress. The work requires vision to see ahead for the steady growth of the Auxiliary and a balanced judgment for the practical. Each point must be considered and then reconsidered from a point of law.

Historian, Mrs. Henry W. Meyerding.—Mrs. Meyerding is particularly well qualified for the important post of recording for posterity. She is a charter member of the Woman's Auxiliary. Her husband is a past president of the United States Section of the International College of Surgeons, and both are conversant with every important event in the history of the College.

Membership Committee, Mrs. Floyd E. Keir, Chairman.—This is a year-round job,

and we are fortunate in having for our chairman Mrs. Keir, who attends a good many of the Regional Meetings and often acts as our Representative at Large.

Memorial Fund Committee, Mrs. Donald L. Dickerson, Chairman.—Mrs. Dickerson is also a charter member and is a constant, devoted worker for the Memorial Fund among her many other activities.

Public Relations, Mrs. Charles W. Weigel.—This is a post that requires a dash of imagination, as our Auxiliary is still in its infancy. We are, however, growing fast, and this growth will furnish really worth-while material in due time.

Printing Committee, Mrs. Jerome J. Moses, Chairman.—Mrs. Moses has the double duty of placing orders for all printed matter and then seeing that the proper committees and officers are supplied with the printed matter they need.

Hall of Fame and School of the History of Surgery, Mrs. Chester W. Trowbridge, Chairman.—This is a comparatively new committee, appointed with the advent of the School of the History of Surgery. This school, unique in the annals of surgery, is located in the International Surgeons' Hall of Fame and offers a series of lectures by outstanding authorities and scholars in surgical history. Mrs. Trowbridge and her committee serve as hostesses at these lectures, and as might have been expected of such a genuinely hospitable person, Mrs. Trowbridge has come up with a set of recommendations to make the lectures more accessible and comfortable for the audience.

Archives Committee.—This committee is in the process of being set up. A chairman and cabinet will be appointed.

ARGENTINE SECTION

At a recent meeting of the Argentine Section of the International College of Surgeons, a roster of new officers was elected, as were a National Regent and 27 Specialty Regents. The new officers of the Section are:

- Dr. Jorge A. Taiana, President
- Dr. José M. Urrutia, First Vice-President
- Dr. Augusto Wybert, Second Vice-President
- Dr. Raúl F. Matera, Secretary
- Dr. Aristóbulo F. Barrionuevo, Acting Secretary

Elected as National Regent for Argentina was:

- Dr. Carlos P. De Nicola

The Specialty Regents chosen by the General Assembly of the Argentine Section are:

- Dr. Roberto A. Goyenechca, Anesthesiology
- Dr. Carlos P. De Nicola, Surgery of the Head and Neck
- Dr. Ricardo Bianchi, Military Surgery
- Dr. Delfor Del Valle (h), Hepatic and Biliary Surgery
- Dr. Clemente Morel, Endocrinology
- Dr. Jorge A. Reales, Abdominal Surgery
- Dr. Benjamín Rivas Díez, Surgery of the Spleen and Hematopoietic Organs

- Dr. José Urrutia, Traumatic Surgery
- Dr. Arturo Martínez Borado, Experimental Surgery
- Dr. Francisco Javier Arias, Gastrointestinal Surgery
- Dr. Roberto Gandolfo Herrera, Gynecologic Surgery
- Dr. José M. Pelliza, Pediatric Surgery
- Dr. Juan Leon, Obstetric Surgery
- Dr. Ernesto R. Bernasconi Crámer, Ophthalmic Surgery
- Dr. Abel N. Canónico, Oncologic Surgery
- Dr. Manuel B. Galea, Oral Surgery
- Dr. Augusto Wybert, Orthopedic Surgery
- Dr. Antonio Carrascosa, Otorhinolaryngologic Surgery
- Dr. Héctor Marino, Plastic Surgery
- Dr. Manuel Casal, Proctologic Surgery
- Dr. Oscar Vaccarezza, Thoracic Surgery
- Dr. Guillermo Iacapraro, Urologic Surgery
- Dr. Eduardo Schieppati, Vascular Surgery
- Dr. Raúl F. Matera, Neurosurgery
- Dr. Eduardo Schieppati, Chemotherapy and Antibiotics in Surgery
- Dr. Manuel Malenchini, Radiology and Physical Therapy in Surgery

AUSTRIAN SECTION

The 1957 Seminar Congress held by the American Medical Society of Vienna, with which the International College of Surgeons is closely affiliated, offers the following lectures (see p. 13) in the field of surgery:

PEDIATRICS

May 2-4—*Surgical Diseases of Children; Pediatric Urology; Acute Abdominal Disease*

June 3-5—*Electromyography; Common Orthopedic Problems in Childhood; Cerebral Palsy; Electroencephalography*

July 1-3—*Emergencies in the Neonatal Period; Erythroblastosis; Reabsorption Atelactosis; Hemorrhage; Acute Feeding Difficulties*

OPHTHALMOLOGY

April 4-6—*Development of Vision in Infants and Children; Ocular Motility; Perimetry*

May 2-4—*Refraction; Ocular Motility; Perimetry*

June 6-8—*Plastic Surgery of the Eye; External Diseases of the Eye; Glaucoma*

July 4-6—*Slit Lamp Microscopy; Ophthalmoscopy; Ocular Therapeutics*

Aug. 1-3—*Electrosurgical Treatment of the Eye; Ocular Cystoectomies; Retinal Detachment*

Sept. 5-7—*Operative Ophthalmology; Gonioscopy, Anomalies*

Oct. 3-5—*Neuro-Ophthalmology; Diseases of the Retina; Physiology of the Eye*

- 3:00 p.m. *The Nailing of Fractures of the Lower Extremities*
Prof. Max Herzog, Krefeld
- 3:30 p.m. *The Osteosynthesis of Fractures*
Prof. Charles Mirallié, Nantes
- 4:00 p.m. Discussion of the reports presented.
- 4:30 p.m. *Infiltration Anesthesia and Operative Section of the Pudendal Nerve for Pelvic Pain*
Prof. Raymond Darget, Bordeaux
- 5:00 p.m. Motion picture on the treatment of fractures (in color).
- 7:30 p.m. Official reception and banquet.

- Sunday, April 7
- 9:45 a.m. *Electrolytes: General Considerations*
Prof. Hamburger, Paris
- 10:15 a.m. *Postoperative Thrombosis and Embolism: Personal Conceptions*
Dr. Marc Iselin, Paris
- 10:45 a.m. *Personal Researches on Thrombosis*
Drs. J. Stalport and Edouard E. M. Nicolas, Huy
- 11:30 a.m. *Emergency Embolectomy of the Lower Extremity: Report of Three Cases*
Dr. G. Lambert, Seraing

COLOMBIAN SECTION

From Dr. Antonio Ordóñez Plaja, F.I.C.S., Secretary of the Colombian Section of the International College of Surgeons, comes the news that the Colombian Section, following the example of the Col-

lege, has sent the sum of \$1,000 to the Comité Pro-Hungria as a gift from the Section. The gift was granted at the Club Medico of Bogota on Dec. 24, 1956.

"We count it the greatest satisfaction,"



Left to right, Dr. Giuseppe Figlioli; Prof. Dr. César A. Pantoja, F.I.C.S., Member of the Executive Council, Colombian Section, and of the International Board of Governors; Prof. Dr. Pedro Eliseo Cruz, F.I.C.S., President of the Colombian Section and of the Colombian Association of Surgeons; Sra. de Rosenberg of the Comité Pro-Húngaros Libres, and Dr. Antonio Ordóñez Plaja, F.I.C.S., Secretary of the Colombian Section.

Bombay. The new members of the Finance Committee are Dr. A. V. Baliga, Dr. A. E. DeSa' and Dr. G. M. Phadke, F.R.C.S. (Eng.), F.I.C.S., Honorary Surgeon, K.E.M. Hospital, Bombay.

The business session of the meeting concluded with a report, delivered by Col. Pandalai, on the Twenty-first Annual Assembly of the United States and Canadian Section, held in Chicago on Sept. 9-14, 1956, which he attended. Dr. A. E. DeSa' reported on the reception and entertainment that had been planned for the American surgeons who visited Bombay in the course of the Second Around-the-World Air Tour of the International College of Surgeons from Nov. 12 to Nov. 15, 1956.

PAKISTANI SECTION

The National Assembly of the Pakistani Section of the International College of Surgeons convened at the Pakistani Institute of International Affairs in Karachi on Nov. 16, 1956. Surgeons from many parts of Pakistan were in attendance. In addition, a group of American surgeons, under the leadership of Dr. Arthur Neal Owens, F.A.C.S., F.I.C.S., official representative of the International College of Surgeons, also attended the Assembly. Owing to the unavoidable absence of Lt. Col. A. K. M. Khan, F.R.C.S. (I), F.A.C.S., F.I.C.S., President of the Pakistani Section, the first morning session was presided over by Dr. M. A. H. Siddiqui, M.A., M.S., F.R.C.S. (Eng.), F.I.C.S.

The program for this session consisted of three lectures, illustrated by means of slides and diagrams; the first of these was entitled, "Some Experimental Evidence of Protection Against Radiation Damage," presented by Dr. M. H. Toosy, Ph.D., F.I.C.S., Professor of Anatomy, Nishtar Medical College, Multan, West Pakistan. Dr. Arthur Neal Owens, F.A.C.S., F.I.C.S., Head of the Department of Plastic Surgery

After the business session, a short scientific session took place. The following papers were presented: "Brain Abscess," Dr. B. Ramamurthi, M.S., F.R.S.E., F.I.C.S., Madras; "Analysis of 100 Consecutive Cases of Mitral Commissurotomy, with up to Three Years of Follow-up Records," Dr. S. K. Sen, F.R.C.S. (Eng.), F.I.C.S., Delhi; "Cancer of the Bladder," Dr. A. Venugopal, M.B., M.S., F.A.C.S., F.I.C.S., Madras, and "Some Surgical Aspects of the Upper Eyelid," Dr. N. T. Mascati, F.I.C.S., Mascati Eye Hospital, Surat.

The program of the Third Annual Meeting of the Indian Section closed with a luncheon for the members and guests participating in the conference.

at Tulane University, New Orleans, Louisiana, discussed problems that arise in plastic surgery. Lt. Col. Said Ahmad, F.R.C.S. (Eng.), F.I.C.S., Professor of Surgery at Dow Medical College in Karachi, delivered a paper on the late repair of injuries of the posterior portion of the urethra. Brief discussions followed the presentation of each of the papers.

The second morning session met under the presidency of Dr. Riaz-i-Qadeer, F.R.C.S., F.I.C.S., Professor of Surgery at King Edward Medical College in Lahore. Dr. M. A. H. Siddiqui, M.A., M.S., F.R.C.S. (Eng.), F.I.C.S., Professor of Surgery at Dow Medical College in Karachi, presented a paper entitled, "The Problem of Peptic Ulcer in Pakistan." The second lecture of this session, entitled "Fracture of the Penis," was delivered by Dr. Amanullah Khan, F.R.C.S. (Eng.), F.I.C.S., Associate Surgeon at Dow Medical College and the Civil Hospital of Karachi.

After Dr. Siddiqui's lecture, Dr. W. J. Kiser of Wichita, Kansas, discussed current methods for the treatment of peptic ulcer in the United States.

Col. Jalal M. Shah described

...1-

- Mar. 15—*Anorectal Abscesses and Fistulas*
Dr. Lino Torre
Malignant Tumors of the Rectosigmoid: Diagnosis and Operative Treatment
Dr. J. Soler-Roig
- Mar. 18—*Modern Concepts of Hepatic Anatomy: Indications and Technic of Hepatectomy*
Dr. A. Sitges
- Mar. 20—*Surgical Treatment of Hydatid Cyst of the Liver*
Dr. Canals Maynor
Benign and Malignant Tumors of the Liver
Dr. F. Vilardell
- Mar. 22—*General Physiopathology of the Portal System: Methods of Investigation (Splenoportographic, Portographic and Manometric)*
Drs. A. Modolell and A. Sitges
- Mar. 25—*Syndrome of Portal Hypertension: Clinical Types*
Dr. Lino Torre
- Mar. 27—*Surgical Treatment of Portal Hypertension: Emergency Methods for Hemorrhage Due to Esophageal Varices: Indications for Splenectomy and Various Technics of "Shunt"*
Drs. A. Sitges and Lino Torre
- Mar. 29—*Surgical Anatomy of the Spleen: Operative Approaches and Technic of Splenectomy: Diagnosis and Treatment of Splenic Trauma*
Dr. Lino Torre
Indications for Surgical Treatment of Hypersplenism
Dr. J. M. Alcover
- April 3—*Primary and Parasitic Cysts of the Spleen: Benign and Malignant Splenic Tumors*
Dr. A. Moliner
Anatomic Review: Approaches and Technics for Pancreatectomy: Embryologic Considerations and Principal Congenital Anomalies
Dr. A. Sitges
- April 5—*Acute Pancreatitis: Pathogenesis, Diagnosis and Treatment*
Dr. Lino Torre
- April 8—*Chronic Recurrent Pancreatitis: Definition, Diagnosis and Treatment*
Dr. A. Sitges
- April 10—*Traumatic Lesions, Fistulas and Lithiasis of the Pancreas*
Dr. A. Moliner
- Cysts and Pseudocysts of the Pancreas*
Dr. M. Miserachs
- April 12—*Benign and Malignant Tumors of the Pancreas, and Duodenum: Radical and Palliative Operations for Carcinoma in This Region*
Dr. J. Soler-Roig
- April 24—*Acute Peritonitis: Pathologic Physiology, Clinical Forms and Treatment in General*
Dr. Lino Torre
Tuberculous Peritonitis
Dr. I. Serés
- April 26—*Nonspecific Mesenteric Lymphadenitis and Tuberculosis*
Dr. A. Moliner
Retractile Mesenteritis: Cysts and Tumors of the Mesentery: Epiploic Pathology (Epiploitis, Torsion, Idiopathic Infarct and Tumors)
Dr. A. Sitges
- April 29—*Acute Abdominal Disease: Concept and General Considerations: Criteria and Opportunity for Operation*
Dr. J. Soler-Roig
- May 3—*Structural Scheme of the Abdominal Walls with their Orifices and Trajectories: Technic of Laparotomy: Prophylaxis and Treatment of Eventration and Evisceration Following Laparotomy*
Dr. Lino Torre
Abdominal Syndromes of Vascular Origin
Dr. R. E. de Sobregrau
- May 6—*Abdominal Contusion: Abdominal and Abdominothoracic Injuries*
Dr. P. Arqué
Postoperative Treatment in Abdominal Surgery
Dr. J. Reventos
- May 8—*Inguinoscrotal and Crural Hernia*
Dr. J. Montaner
- May 10—*Omphalocele: Umbilical and Epigastric Hernias*
Dr. R. Balcells
Strangulated Hernia: Types and Surgical Treatment
Dr. J. Montaner

The wide scope of this program and the well-known ability of the lecturers are consonant with the quality of the service offered the College by Prof. Soler-Roig. We are sure that those who are able to take advantage of this fine course will long remember it as a unique scientific experience.

formation and applications may be secured by writing to Dr. Ralph E. Snyder, Dean, New York Medical College, 1249 Fifth Avenue, New York 29, New York, Registration is limited, and the tuition is \$150.

Bahamas Medical Conference at Easter Season

The Bahamas Branch of the British Medical Association, at its last monthly meeting, approved the holding of another Bahamas Medical Conference during the week after Easter, April 23-30, 1957. The British Colonial Hotel and the Princess Margaret Hospital in Nassau will house the conference. Lectures on weekdays will be given from 9:30 to 11 a.m. and from 5:30 to 7 p.m. Two evening lectures and two meetings at the hospital have also been scheduled. Full particulars about the conference may be secured by writing to Dr. B. L. Frank, Bahamas Medical Conference, P. O. Box 148, British Colonial Hotel, Nassau, Bahamas.

Public Health Training Program Gets Under Way

The United States Public Health Service has announced the names of the national advisory committee to assist in a new public health training program voted by Congress at the last session and has been duly constituted. The three-year training program provides funds to enable physicians, nurses, engineers, and other professional health personnel to secure graduate or specialized training in public health.

At the time of this report, over 300 traineeships, amounting to nearly \$1,000,000, have been awarded, either directly by the Public Health Service or through grants to training institutions. Two hundred and sixty-two persons are already attending academic institutions with the funds provided for the first year of the program.

Members of the National Advisory Committee on Public Health Traineeships met with Surgeon General Leroy E. Burney recently to discuss plans and policies for

awarding traineeships for the 1957-1958 academic year.

Eleventh Annual Symposium on Fundamental Cancer Research

The Eleventh Annual Symposium on Fundamental Cancer Research will be offered by the University of Texas, M. D. Anderson Hospital and Tumor Institute, Texas Medical Center, Houston 25, Texas, on March 7-9, 1957. The general topic for the symposium is, "Viruses and Tumor Growth." Many outstanding investigators in the field of cancerology will present reports on their observations and studies.

Second World Conference on Medical Education to Be Held in 1959

The World Medical Association, which sponsored the First World Conference on Medical Education in London in 1953, is planning a second conference on the same pattern, to be held in Chicago Aug. 30-Sept. 4, 1959. The theme of the Second World Conference will be "Medicine—A Lifelong Study."

The Program Committee, under the chairmanship of Dr. Victor Johnson, Director of the Mayo Foundation for Medical Education and Research, University of Minnesota Graduate School, invites members of medical schools and faculties; members of national medical associations and their medical education committees, and organizations and individual persons interested and qualified in medical education to submit topics and problems pertinent to the continuing education of a doctor after graduation from medical school.

Four general section subjects are currently being considered. These are: (1) Basic Clinical Training for all Doctors; (2) Advanced Clinical Training for General and Specialty Practice; (3) Education for Research and Teaching, and (4) Methods of Continuing Medical Education Throughout Life.

Dr. Raymond B. Allen, Chancellor of the University of California at Los Angeles, has been named President of the Second World Conference. At the First

IN MEMORIAM
ERNEST NOVAK, M.D., F.I.C.S.
1899-1956

Since 1952, when Dr. Ernest Novak became a Fellow of the International College of Surgeons, his real and vital personality has emerged little by little from his many letters. The concept of him as a person casts unreality on the news of his untimely death in West Pakistan on Oct. 18, 1956. The events of his life symbolize the unsettled state of our world, and it is fitting for us to review them in remembering him.

He was born in Kolozsvár, Hungary, on May 15, 1899, and completed his preliminary schooling in the city of his birth. As an extremely young commissioned officer, he saw active service in World War I. After his term of military duty, he began his medical studies at the Medical College of the University of Budapest, where he earned his degree of Doctor of Medicine in 1924.

Between the two world wars, as he related in his letters, he had the good fortune of working for a long period in the clinics of many leading surgeons. His teacher, the ingenious Prof. Verebélyi, sent him for further surgical training to Vienna and Germany. For several years he also studied in the clinics of Gosset, Voronoff and Hartmann in Paris and with Donati in Milan. When Kolozsvár, the capital of Transylvania, once more became part of Hungary, he was named Professor of Operative Surgery.

For eighteen years Dr. Novak worked as a surgeon and teacher of surgery in his native land, contributing nearly a hundred scientific papers to Hungarian and German professional journals and writing six books on various surgical topics.

During World War II he was again drawn into military service. He was surgical advisor to the Hungarian Army and President of its Medical Council. Referring to this period in one of his letters, Dr. Novak said, "We in the army experienced but little from the Nazi regime; we fought against communism and knew why; when the battle for Hungary was lost, we retreated to Germany; the collapse reached me in Halle. . . ."

As a stateless person whose country had collaborated with the Nazis, he was not entitled even to those benefits that were accorded to displaced persons. In the aftermath of war he was assigned to work in a large hospital for displaced persons, serving as Chief Surgeon of the hospital. Three years after the end of the war, he was able to secure a visitor's visa for a short stay in Ireland. Immigration regulations, however, made it impossible for him to make any permanent plans either in Ireland or in England.

He neither wished nor thought it wise to attempt to return to Hungary, which, as he put it, was laboring under a continuation of its thousand-year history of "countless dreadful experiences." He was sure that his country had adopted its political countenance under duress, and fervently hoped that "some happy change" would again permit Hungarians to continue their "national life where we lost it by losing the war." To such a change and to such a time he looked forward.



FOUNDED BY DR. MAX THOREK

The Journal of the International College of Surgeons

FOUNDED IN GENEVA, SWITZERLAND, 1935 - INCORPORATED IN WASHINGTON, D. C., 1940

Vol. XXVII

APRIL, 1957

No. 4

General Surgery

Surgical Management of Gastric and Duodenal Ulcer in Japan

TSUNERO TANIGUCHI, M.D.*

CHIBA, JAPAN

WHEN ulcer occurs in the stomach or the duodenum, it is essential to eradicate the patient's fear of its recurrence and of possible malignant change, since surgical intervention is indicated for such patients. On the basis of this principle, it would seem quite natural that an ulcer must be removed if cure is desired. One must keep in mind, however, the complications that follow surgical treatment of these lesions. Among them, postoperative peptic ulcer is the most significant and has posed a problem concerning the present treatment of ulcer of the alimentary tract. Patients with postopera-

tive peptic ulcer suffer unbearably and are always obsessed by the danger of perforation or penetration. What is worse, the difficulties of reoperation in such a situation cause the surgeon great anxiety. Recalling 28 patients with postoperative peptic ulcer whom I have studied for the past few years, I am impressed by the fact that the majority of them have undergone gastroenterostomy, and that the next largest group consists of those treated by gastrectomy without removal of the ulcerated area (Table 1). Another interesting point is the fact that in most of the cases there was a history of duodenal ulcer prior to the initial operation. These facts, as well as the difficulties of reoperation in such circumstances, have led me to realize the

*Associate Professor of Surgery, Nakayama's Surgical Department, School of Medicine, Chiba University, Chiba.
Submitted for publication Oct. 16, 1956.

areas were 1 mm or less, others 1 cm or more in diameter, a few involved as much as one-third of the membrane. Usually such changes were discernible macroscopically. 3 Ectodermal proliferation without apparent changes in the other two layers (fig 3). This occurred in patchy areas varying in size. 4 Proliferative changes in both ectoderm and endoderm without changes in the mesoderm (figs 4, 5 and 6). These were comparatively rare, and occurred only in small patches never averaging more than 1 mm in diameter. 5 In older membranes, round or irregular patches of epithelium projecting from the epithelial layers or apparently developing independently in the mesoderm (fig 5) were observed.

Wherever ectodermal proliferation was noted, it caused thickening of the layer, sometimes to the extent of eight or more cells in depth (fig 2). These cells, however, had no definite arrangement in layers, and, as a rule, were greatly enlarged (fig 6). Many of them were vacuolated and some contained generally rounded bodies (figs 2, 3, 7, 8, 9, 11, 14), varying in size from minute deposits to masses larger than a "normal" cell. In some areas practically every cell contained them. Occasionally cells of the endodermal layer showed similar changes (fig 10). Frequently the inclusions appeared to be intranuclear (figs 12, 13). Often they were adjacent or in close proximity to chromatin-like material apparently resulting from degenerative changes in nuclei. Most often, however, they did not appear to bear any relation to nuclear material. The "inclusions" stained pale pink to deep red by Goodpasture's method.

The degree of œdema and ectodermal proliferation appeared to depend upon the age of the embryo. At the ten-day period small localised areas or a narrow zone of œdema could usually be found in the region of the albuminous deposit. At the tenth and eleventh day the areas of ectodermal proliferation were well developed and showed vacuolation and inclusions. From the thirteenth to the fifteenth day the phenomenon reached its maximum, thereafter beginning to resolve. On the thirteenth and fourteenth days the chorio-allantoic membranes quite regularly presented areas 1 mm or more in thickness and at this stage usually showed most pronounced ectodermal proliferation. After the fifteenth day the œdema rapidly decreased and was rarely noted after the seventeenth day. The areas of ectodermal proliferation were also scarcer after the fifteenth day. About this time, however, small irregular or ball-like areas of epithelial tissue began to develop from both ectodermal and endodermal layers. Some such areas were identical with those described as occurring in the mesoderm as a result of virus activity but serial sections always proved them to be papillary projections from either ectoderm or endoderm.

Relationship Between Anchoring Sutures and the Pancreatic Duct: To acquire a better understanding, the pancreas may be divided in the following manner (Fig. 1): First, assuming the adherent portion of this gland with the duodenum to be a zone in subdividing this gland, denoted as *C*. The portion to the right of portion *C*, such as the isthmus, the tuber omentale and others, are designated by capital letters *D*, *E*, etc., respectively. Anchoring sutures are most commonly placed into portion *E*, and next commonly into portion *D* or *C*. Roentgen studies and measurements of consecutive transections of this gland were done in order to ascertain the precise location of the pancreatic duct. The roentgenogram of the pancreas taken in the ventrodorsal direction revealed that the main duct ran along the middle portion of this gland, meandering to some extent. Another roentgenogram, taken in the cranio-caudal direction, revealed that the main duct ran dorsally in the head of this gland (Fig. 2). The needle seen in this picture indicates the site of the anchoring sutures. Consecutive transections used in this study were obtained from the specimen which had been treated with solution of formaldehyde after the injection of red opaque substances into the main duct. Table 2 presents the data on location of the main duct obtained from 12 fresh corpses. It will be noted that the head of the pancreas, portion *A* and *B*, is wider, while the isthmus, portion *D*, is the narrowest. It will be understood also that the main duct runs dorsally in the head of the pancreas and that it is not compromised by these anchoring sutures, placed at most only 2 mm. deep.

b. Histologic Changes: Histologic study was done in both animal and clinical cases in order to pursue the postoperative changes of the pancreas. In experiments on dogs, a consecutive observation was carried out for one week to six months

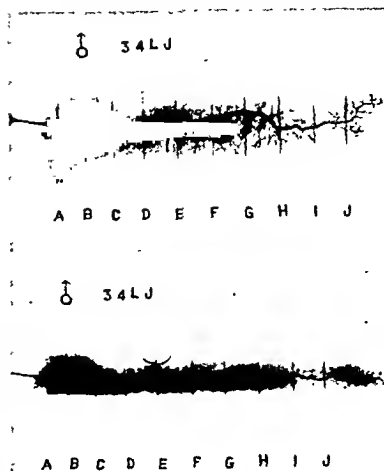


Fig. 1.—Roentgenograms of pancreatic duct. The needle indicates the site of anchoring sutures.

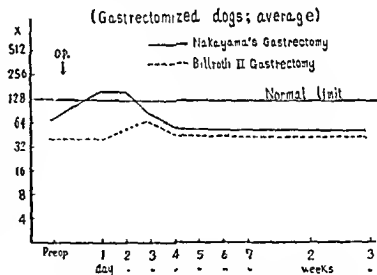


Fig. 2.—Serum amylase concentration.

after operation by this method. Clinical study was also done with patients who died of some complication not involving this gland. This study indicated the following facts: In one week there occurred an adhesion between the gastric and the

areas were 1 mm or less, others 1 cm or more in diameter, a few involved as much as one-third of the membrane. Usually such changes were discernible macroscopically. 3 Ectodermal proliferation without apparent changes in the other two layers (fig 3). This occurred in patchy areas varying in size. 4 Proliferative changes in both ectoderm and endoderm without changes in the mesoderm (figs 4, 5 and 6). These were comparatively rare, and occurred only in small patches never averaging more than 1 mm in diameter. 5 In older membranes, round or irregular patches of epithelium projecting from the epithelial layers or apparently developing independently in the mesoderm (fig 5) were observed.

Wherever ectodermal proliferation was noted, it caused thickening of the layer, sometimes to the extent of eight or more cells in depth (fig 2). These cells, however, had no definite arrangement in layers, and, as a rule, were greatly enlarged (fig 6). Many of them were vacuolated and some contained generally rounded bodies (figs 2, 3, 7, 8, 9, 11, 14), varying in size from minute deposits to masses larger than a "normal" cell. In some areas practically every cell contained them. Occasionally cells of the endodermal layer showed similar changes (fig 10). Frequently the inclusions appeared to be intranuclear (figs 12, 13). Often they were adjacent or in close proximity to chromatin-like material apparently resulting from degenerative changes in nuclei. Most often, however, they did not appear to bear any relation to nuclear material. The "inclusions" stained pale pink to deep red by Goodpasture's method.

The degree of oedema and ectodermal proliferation appeared to depend upon the age of the embryo. At the ten-day period small localised areas or a narrow zone of oedema could usually be found in the region of the albuminous deposit. At the tenth and eleventh day the areas of ectodermal proliferation were well developed and showed vacuolation and inclusions. From the thirteenth to the fifteenth day the phenomenon reached its maximum, thereafter beginning to resolve. On the thirteenth and fourteenth days the chorio-allantoic membranes quite regularly presented areas 1 mm or more in thickness and at this stage usually showed most pronounced ectodermal proliferation. After the fifteenth day the oedema rapidly decreased and was rarely noted after the seventeenth day. The areas of ectodermal proliferation were also scarcer after the fifteenth day. About this time, however, small irregular or ball-like areas of epithelial tissue began to develop from both ectodermal and endodermal layers. Some such areas were identical with those described as occurring in the mesoderm as a result of virus activity but serial sections always proved them to be papillary projections from either ectoderm or endoderm.

tained that few ill effects on pancreato-hepatic function occurred after use of this operative method, and that no great risk associated therewith would be present throughout the postoperative period.

Advantages of the Method.—1. **Resectability:** Statistical surveys were made in 1034 cases of ulcer in which the patients were operated on in Nakayama's Clinic from August 1946, to February 1954. The data in Table 3 show the results. As is shown in Figure 4, ulcer occurs frequently below the pyloric ring. The upper portion of the duodenum, located between the pyloric ring and the papilla of Vater, may be subdivided into three zones for purposes of discussion. Those lesions located in the upper third (66.5 per cent of all cases), were resectable even by conventional methods, while perforated lesions in the same zone, lesions in the middle

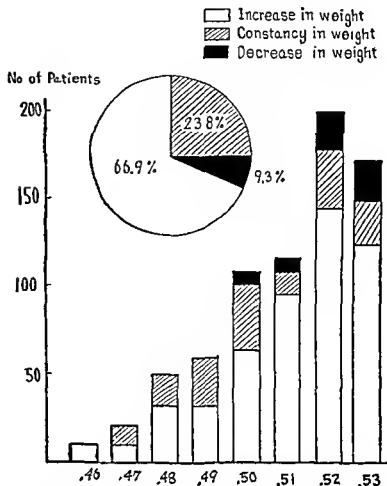


Fig. 4.—A survey of body weight in the follow-up period.

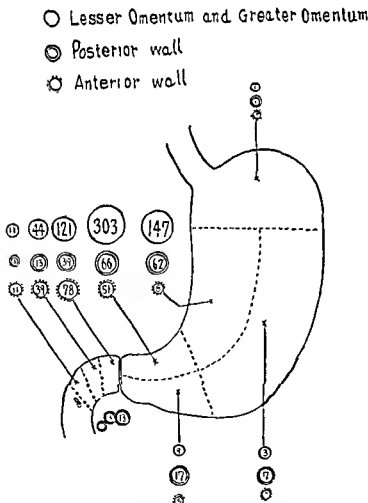


Fig. 3.—A survey of the distribution of peptic ulcer.

third (26.3 per cent of all cases), and lesions in the lower third (6.7 per cent of all cases) were not resectable by the conventional method in more than half.

Comparison of resectability rate between Nakayama's Clinic and the main Japanese hospitals is as shown in Table 4, from which it will be easy to understand how a high degree of resectability is permitted by this operative method, especially among patients with duodenal ulcer. This high resectability rate, one of the most prominent features of the Nakayama method, is effected by providing one layer of posterior sutures and anchoring sutures to the head of the pancreas.

2. Operative Mortality Rate: The operative mortality rate is another criterion on which an evaluation of an operative technic is made. Table 5 indicates the statistical surveys covering

have been transmitted through the hen or else have entered the egg through the unbroken shell. If either of these be possible, then the propagation of extraneous viruses on the membrane must be considered as fraught with much difficulty.

We do not wish to imply that virus growth and multiplication does not take place in the chorio-allantoic membrane. Such does occur, and may initiate quite typical changes. We do, however, wish to advise caution in the interpretation of "reactions" occurring in this delicate membrane. It is possible that virus multiplication and growth in the membrane is initiated independently of or because of the normal hypertrophic and regressive changes normally occurring in it, and that these changes do not, as a rule, represent the results of virus action.

Summary

A critical review of the literature pertaining to the propagation of filterable viruses on the chorio-allantoic membrane of the chick reveals reports of non-specific changes resembling those ascribed to the growth of viruses upon this membrane.

This communication records findings in the uninoculated chorio-allantoic membrane of chick embryos similar to those reported by other investigators when filterable viruses were grown upon it.

These changes consist essentially of cedema of the mesoderm, proliferation and vacuolation of the cells of the ectoderm with the presence of "inclusion" bodies and occasional proliferation of the endoderm.

No claim is made that viruses do not multiply on the chorio-allantoic membrane of developing chicks, but caution is urged in interpreting the histological changes believed to be initiated by such growth.

REFERENCES

- | | |
|-------------------------------|---|
| BRANDLY, C A | Some studies of infectious laryngo tracheitis. The continued propagation of the virus upon the chorio allantoic membrane of the hen's egg. <i>J Infect Dis</i> , 1935, lvi 201 |
| BURNET, F M | The propagation of the virus of infectious laryngo tracheitis on the chorio allantoic membrane of the developing egg. <i>Brit J Exp Path</i> , 1934, xv 52 |
| BURNET, F M, AND BARNARD, J E | A virus disease of the canary of the fowl pox group. <i>this Journal</i> , 1933, xxxvii 107 |
| BURNET, F M, AND FERRY, J D | The differentiation of the viruses of fowl plague and Newcastle disease. experiments using the technique of chorio allantoic membrane inoculation of the developing egg. <i>Brit J Exp Path</i> , 1934, xv 56 |

malarial drugs, every surgeon in the tropics has to suspect malaria as a cause of fever in newly admitted or postoperative patients. Examination of the thick blood film fortunately indicates the proper diagnosis, and treatment can be instituted at once. I have observed several cases of minor trauma in which, after admission to the hospital, there has been fever and malaria parasites have been present in the blood.

Rupture of the spleen, although rare in British Honduras, still occurs. Splenectomy, performed as early as possible before the catastrophic intraperitoneal hemorrhage has occurred, is a life-saving measure.

Most common, from the surgical point of view, is infestation by worms. It would hardly be an exaggeration to state that the majority of children in tropical countries, if not all, have intestinal worms. These poor children come to the hospital with a great variety of abdominal disturbances, ranging from violent symptoms of acute abdominal disease to mild indigestion and malnutrition. Infestation with *Ascaris lumbricoides* often demands surgical intervention. In my practice in British Honduras I have had to perform several laparotomies on children. They were admitted to the hospital with symptoms of acute obstruction, peritonitis or appendicitis and required emergency operations. In 1 case of obstruction I discovered that this was caused by about 150 live ascarid completely blocking the intestinal lumen. The child was admitted too late and unfortunately died after the operation. Another, a 5-year-old boy, had *Ascaris lumbricoides* in the appendix (Fig. 2). He was admitted to my department with symptoms of acute abdominal disease, a temperature of 100F. and a pulse rate of 140. Laparotomy revealed some free fluid in the abdominal cavity, bluish discoloration of the intestine and the presence of two live ascaridia in the



Fig. 2.—Appendicular obstruction by *A. lumbricoides* (author's case).

appendix. After appendectomy oil of chenopodium mixture was given, and three days later the child passed another ascaris. Convalescence was otherwise uneventful, and the boy was discharged from the hospital twelve days later.

Amebiasis.—Although amebiasis may occur in every country, patients in the tropics usually seek medical aid in the late stages of the disease. The surgeon may encounter cases of colitis, with bleeding ulcerations, or abscess of the liver. The first condition may sometimes cause dangerous bleeding, perforation and peritonitis and calls for emergency laparotomy; the second usually requires aspiration of the abscess. Treatment of either is successful only if supported by emetine or chloroquin. Often on opening the abdomen for peritonitis, I have observed one or more perforated ulcers of the colon. Recovery followed repair of the perforations and the administration of emetine. In 1 case of hepatic abscess (the first I ever encountered), I aspirated several times, removing a total of 3 pints of "chocolate" pus. This aspiration, supported by chloroquin, produced quick recovery.

Malnutrition.—Malnutrition is exceedingly common in the tropics. It is caused not only by an insufficient and unbalanced diet but by poor function of the liver,

mixtures of these. Different races or even different tribes living in the same surroundings react differently. Many theories have been tried to explain this fact, but thus far none is sufficiently convincing. Without going into the details of such an interesting subject, I should like only to mention some observations made in British Honduras.

1. The people of one tribe, The Caribs (probably of African origin) have a much longer life span than do the original inhabitants of this country, the Maya Indians. Caribs live up to the age of 80, but Maya Indians seldom reach the age of 50. The Maya Indians have low natural resistance



Fig. 4.—Above, high power photomicrograph (hematoxylin and eosin stain) of centrilobular vein from hepatic biopsy specimen in case of boy shown in Figure 3, showing beautiful example of vascular occlusion. Below, low power photomicrograph of same case, stained with 1 (Photomicrographs).



Fig. 5.—Fibroids of auricle developing after perforation of lobes for earrings (author's case).

to disease and are poor surgical risks.

2. The fibroblastic diathesis of the Negro race is another racial peculiarity. There is

thoroughly boiled previous to inoculation. As a matter of fact, media of this type (broth containing pieces of meat at the bottom of the vessel) are commonly used for the production of this toxin. It is, however, of advantage to use homogeneous medium for the purpose of following quantitatively certain of the changes which occur in the composition of the medium during growth. For this reason we have preferred to use ordinary veal broth with an addition of peptone (1 per cent Riedel peptone), carefully boiled previously to inoculation and covered with a thick layer of liquid paraffin. Under these conditions the growth has always been good. Before autoclaving the pH was adjusted to 8.0 and after autoclaving it was found to range between 7.3 and 7.9. The sterile broth was kept in the ice-box in one-litre flasks, previous to the cooking. 20-30 g sterile calcium carbonate and, eventually, glucose in a sterile 50 per cent solution were added. The *coli*-fermented broth used in some of the experiments was prepared by inoculating the broth with *Bact coli* and by keeping it at 37° C for about 20 hours. After heating the culture for a short time in a boiling water-bath it is filtered through a paper-filter, the pH was adjusted to 8.0, and the medium was sterilised by autoclaving. In all these experiments we have continuously stirred the medium during the whole incubation period, as described in a previous paper (1933). To 1000 cc of the medium 1 cc of a 24 hours' culture in "meat broth" was added, and the incubation took place in a water-bath at 37° C.

Table I and chart 1 indicate the result of an experiment with *Cl. oedematiens* in a medium which, besides 1 per cent Riedel peptone, contained 0.1 per cent glucose.

As will be seen, the growth of the bacteria does not, under these conditions, produce any measurable changes in the composition of the broth (pH, toxin, and proteolytic enzymes) during the first

TABLE I

Toxin production etc. by Cl. oedematiens (strain 4) grown on 1 per cent Riedel peptone and 0.1 per cent glucose at 37° C

Days	pH	Toxin (mld in 1 cc)	Toxin (L ₊ in 1 cc)	Increase of formal titratable amino-N (mg per 100 cc)
0	7.75	0	0	0
1	7.75	0	0	0
2	6.65	2000	143	16.3
3	7.00	3330	250	26.0
4	7.15	5880	330	32.6
5	7.30	6670	330	38.1
6	7.35	3330	250	41.6
7	7.45	2000	110	46.7
9	7.55	670	63	53.5
12	7.70	370	40	74.7

There are many theories concerning the cause of this disease, which I shall not mention here. I wish to call attention, however, to the marked incidence of this condition in Negroes. It seems almost to be a racial peculiarity. Can it be due to the racial fibroblastic tendency? Does the condition follow trauma or irritation during their well-known early sexual activity?

4. *Another racial disease of the Negro* is sickle cell disease, which can cause many pathologic changes in bone marrow, e.g., osteomyelitis or avascular necrosis of the head of the femur. Examination of the blood for sickle cells is advisable in all operative cases, as fatal postoperative complications due to unrecognized sickle cell disease have occurred (Fig. 7).

Malignant Growth.—The most common malignant growth in British Honduras is carcinoma of the cervix. During the first

six months of this year I have observed 26 cases more than I encountered last year. This is a very high figure for a population of 80,000. Many more cases confront other doctors during that time; many more are no doubt lying unnoticed in remote villages.

Some of the patients have been comparatively young women. This is in agreement with recent work at U.C.W.I. by Bras, Stewart, Pinkerton and Miller, which shows that the maximum incidence of carcinoma of the cervix in Jamaica is reached ten years earlier than in the United States and fifteen years earlier than in England (Fig. 8).

In explanation of this early age incidence I am inclined to the opinion that cervical carcinoma tends to appear earlier in women whose sexual activity and childbearing begin earlier. If one accepts the theory that sexual activity and childbearing have a carcinogenic action which "take an average of twenty years to produce its effect" (Malphrant, 1948), one easily finds an explanation of the early age incidence, as it is known that sexual activity and childbearing begin among tropical peoples shortly after puberty.

Treatment of carcinoma of the cervix in some remote places in the tropics is difficult because 1) the patient usually comes to the hospital in an advanced stage of the disease (second, third or fourth), 2) and not all hospitals have facilities for irradiation treatment and the patients are too poor to afford travel abroad. In many cases, therefore, operation alone, no matter how extensive, does not secure a successful result.

Early microscopic diagnosis is the essential factor. In differential diagnosis special attention should be paid to granuloma inguinale and tuberculosis of the cervix which sometimes show similar clinical pictures.

In connection with this disease, I should like to stress the great number of vaginal

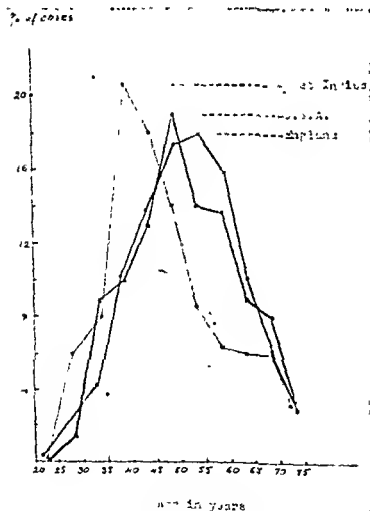


Fig. 8.—Incidence of carcinoma of the cervix in relation to age.

produces a considerable effect on the production of gas-gangrene toxins, we have investigated the importance of this factor with respect to *oedematis* toxin. For this purpose the broth mentioned above has served, and experiments with 2 0, 0 5 and 0 1 (see table I and chart 1) per cent glucose were carried out. We have also used broth without the addition of glucose, and also a broth free of sugar (*colh*-fermented). The experimental conditions were as described above, and the results will be found in tables II-V.

In all these experiments growth was good, but, while the highest toxin concentration in the experiments with 2 0, 0 5 and 0 1 per cent glucose only reached a value of 6670 *m l d* per c c, it was considerably higher in the experiment with broth to which no glucose had been added (20,000), and still higher in the experiment carried out with broth free from sugar (*colh*-fermented) when it reached 50,000 *m l d*. This is in accord with Barg's findings.

TABLE II

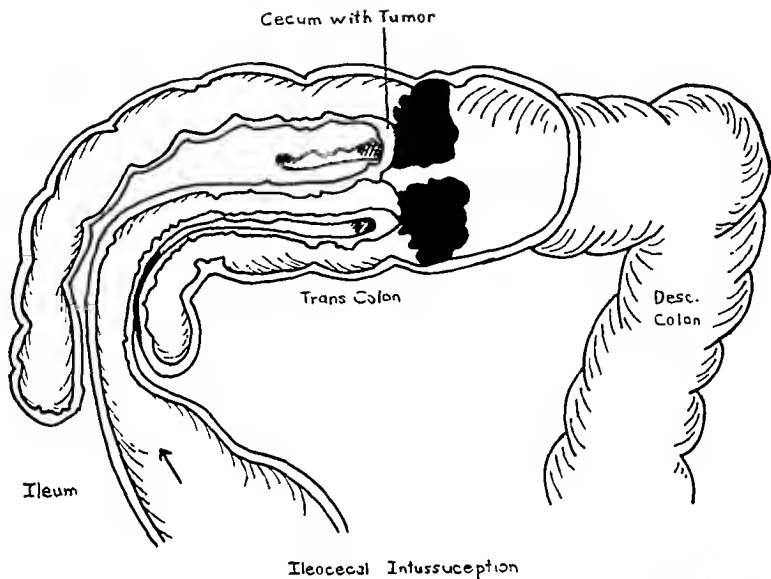
Toxin production etc by Cl oedematis (strain 4) grown in 1 per cent Riedel peptone and 2 per cent glucose at 37° C

Days	pH	Toxin (<i>m l d</i> in 1 c c)	Toxin (<i>L₊</i> in 1 c c)	Increase of formal titratable amino-N (mg per 100 c c)
0	7 30	0	0	0
1	7 30	0	0	0
2	7 15	100	10	0
3	6 80	250	20	0
4	6 20	1250	29	0
5	5 95	4540	67	1 9
6	5 90	5880	165	7 0
7	5 95	6670	250	12 1
9	6 40	6670	400	25 7
12	6 95	6670	500	56 0
16	7 10	6670	500	89 1

TABLE III

Toxin production etc by Cl oedematis (strain 4) grown in 1 per cent Riedel peptone and 0 5 per cent glucose at 37° C

Days	pH	Toxin (<i>m l d</i> in 1 c c)	Toxin (<i>L₊</i> in 1 c c)	Increase of formal titratable amino-N (mg per 100 c c)
0	7 45	0	0	0
1	7 45	0	0	0
2	6 35	333	5	0
3	6 65	4000	167	11 7
4	6 80	5000	200	18 1
5	7 00	6670	250	22 2
6	7 10	6670	250	28 0
7	7 15	6670	250	31 5
9	7 25	6670	250	41 6
12	7 30	6670	250	50 2



L. K. STALKER, JR.

Diagram showing ileocecal intussusception produced by carcinoma of cecum.

lower quadrant. This was freely movable and extended across the lower part of the abdomen. On three consecutive examinations after admission to the hospital the mass seemed to increase in size. No audible or visible peristalsis was present, and the mass was not tender. Rectal and pelvic examinations were non-contributory. The white blood cell count was within normal limits. The value for hemoglobin was 8.7 Gm. per hundred cubic centimeters of blood. The erythrocytes numbered 3,480,000 per cubic millimeter. A complete analysis of the blood for chlorides, urea nitrogen, carbon dioxide, sodium and potassium, as well as a urinalysis, revealed no more than minor changes due to dehydration, which were promptly corrected by intravenous therapy. A roentgenogram of the abdomen taken without barium showed no evidence of gas in either the small or the large intestine. After a saline

catharsis and enemas, roentgenographic studies of the colon were done on two occasions. These revealed no evidence of obstruction. The colon could not be filled beyond its left transverse portion. There were no localized signs of obstruction, and the diagnostic coiled spring ensheathment pattern of intussusception was not observed. An intravenous pyelogram revealed no abnormality. A gastrointestinal series with a follow-through of the small bowel was then done. There was a pronounced degree of achalasia of the esophagus, barium being retained in it for five hours. The stomach filled slowly, but no intrinsic lesion was demonstrated. Barium was retained in a large atonic duodenal cap for four to five hours. The terminal portion of the ileum appeared abnormal, with a loss of mucous membrane pattern and slight dilatation in the region of the terminal portion of the ileum. The ce and

production (0.5 per cent in table VI and 3 per cent in table VII), the broth used being of the *coli*-fermented type

TABLE VI

Toxin production etc by Cl œdematiens (strain 4) grown in broth with 0.5 per cent Riedel peptone and free from sugar (coli-fermented) at 37° C

Days	pH	Toxin (m.l.d. in 1 c.c.)	Toxin (L ₊ in 1 c.c.)	Increase of formal titratable amino-N (mg per 100 c.c.)
0	7.90	0	0	0
1	7.90	0	0	0
2	7.90	0	0	0
3	7.90	0	0	0
4	7.20	10,000	250	0.3
5	7.30	33,000	500	4.7
6	7.45	50,000	660	7.9
7	7.60	25,000	660	11.7
9	7.85	20,000	660	14.0
12	8.20	10,000	500	18.1

TABLE VII

Toxin production etc by Cl œdematiens (strain 4) grown in broth with 3 per cent Riedel peptone and free from sugar (coli-fermented) at 37° C

Days	pH	Toxin (m.l.d. in 1 c.c.)	Toxin (L ₊ in 1 c.c.)	Increase of formal titratable amino-N (mg per 100 c.c.)
0	7.70	0	0	0
1	7.70	0	0	0
2	7.70	0	0	0
3	7.70	0	0	0
4	7.50	1,430	100	0
5	7.25	100,000	1670	0.8
6	7.40	66,000	1540	6.1
7	7.50	50,000	1330	14.0
9	7.75	20,000	1000	23.4
12	8.00	5,000	400	32.7

From these experiments and that recorded in table V it appears that the peptone concentration is not of special importance. The investigations, however, tend to show that an addition of 1 per cent or more of peptone gives a somewhat greater toxin production—particularly, perhaps, in regard to the antitoxin-binding capacity—than an addition of smaller quantities.

We have also examined toxin production in Martin's broth as well as in ordinary broth with an addition of Witte peptone on Difco-proteose peptone, and in broth cooked on horse liver, to which 1 per cent Riedel peptone had been added, all the media were freed of the fermentable carbohydrates by means of *coli*-fermentation. Growth in all these media was satisfactory and the toxin production was also good in most cases, but in no instance

Folge eines Zökumkarzinoms berichtet. Ein komplizierender Faktor bestand in einem Kardiospasmus. Wahrscheinlich bestand der Krebs bereits seit mindestens einem Jahr, seine Entdeckung wurde aber wohl durch das gleichzeitige Vorliegen des Kardiospasmus verzögert.

RIASSUNTO

Viene riferito un caso di intussuscezione ileo-cecale in adulto, dovuta ad un carcinoma del ceco e complicata da achalasia dell'esofago. Si ritiene probabile che il carcinoma fosse presente da almeno un anno e che la sua scoperta sia stata ritardata

dalla presenza della achalasia esofagea.

RÉSUMÉ

L'auteur décrit un cas d'invagination iléocœcale chez l'adulte, provoquée par un carcinome du rectum compliqué d'achalasia de l'œsophage. Il est à présumer que le carcinome datait d'un an au moins; son diagnostic a été retardé du fait de la complication œsophagienne.

REFERENCE

1. Brayton, D., and Norris, W. J.: Intussusception in Adults, *Am. J. Surg.* 88:32-43 (July) 1954.

The world at the present day stands in need of two kinds of things. On the one hand, organization—political organization for the elimination of wars, economic organization to enable men to work productively, especially in the countries that have been devastated by war, educational organization to generate a sane internationalism. On the other hand it needs certain moral qualities—the qualities which have been advocated by moralists for many ages, but hitherto with little success. The qualities most needed are charity and tolerance, not some form of fanatical faith such as is offered to us by the various rampant isms. I think these two aims, the organizational and the ethical, are closely interwoven; given either the other would soon follow. But, in effect, if the world is to move in the right direction it will have to move simultaneously in both respects. There will have to be a gradual lessening of the evil passions which are the natural aftermath of war, and a gradual increase of the organizations by means of which mankind can bring each other mutual help. There will have to be a realization at once intellectual and moral that we are all one family, and that the happiness of no one branch of this family can be built securely upon the ruin of another. At the present time, moral defects stand in the way of clear thinking, and muddled thinking encourages moral defects. Perhaps, though I scarcely dare to hope it, the hydrogen bomb will terrify mankind into sanity and tolerance. If this should happen we shall have reason to bless its inventors.

—Russell

been added and when carbohydrates have been removed by means of *Bact coli*

2 The quantity of toxin produced was largest in broth free of sugar (50,000 *m l d* per *c c*), smaller in broth without the addition of sugar, and still less in media to which glucose had been added (6000-7000 *m l d* per *c c*)

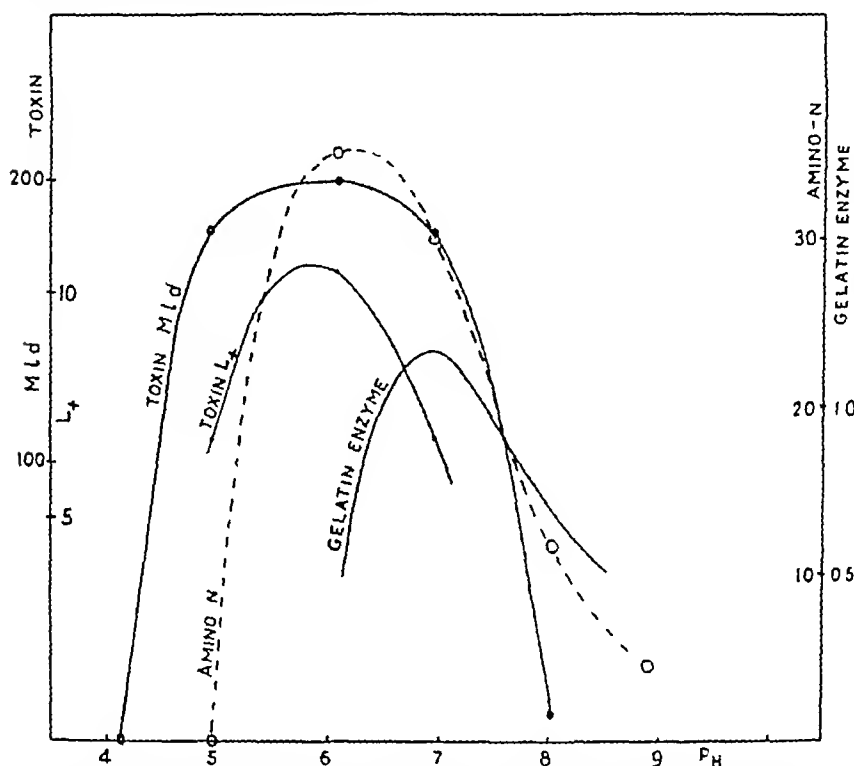


CHART 2—Stability of *Cl. oedematis* toxin at varying pH Action optimum of the gelatin melting and the albumose splitting enzymes

3 The peptone concentration of the medium is not of special importance, but an addition of 1 per cent and more (Riedel) appears to give a somewhat greater toxin production than when smaller quantities are added

4 The toxin has its optimum of stability in the neighbourhood of pH 6 The optimum of the effect of the albumose-digesting enzyme ranges between pH 6 and 7

REFERENCES

- BARG, G S 1933 *Z Immunitätsforsch*, lxxix 187
 CELAREK, J, AND STETKIEWICZ, 1936 *C R Soc biol*, cxxii 143
 S
 KAWAMURA, H 1930-31 *Arb Reichsgesundheitsamte*, lxi 427

(This is a condition rarely encountered by American surgeons.) It was in the treatment of vesical sequelae following tuberculosis of the kidney that I gained my experience. Furthermore, what is true for chronic tuberculous cystitis is equally true for chronic nontuberculous cystitis.

My first operations, in 1951, had one aim: enlarging contracted bladders (ileocystoplasty for enlargement) with the hope of reducing the intense pollakiuria of these patients. I was always successful in reducing frequency of urination, and in rare instances even returned it to normal. This amelioration, which satisfies the patient, is of variable importance. In fact, the operation is the same in all such cases (the bladder is enlarged by the substitution of an iliac loop which gives it a normal capacity), but, surprisingly enough, the patient remains more or less pollakiuric. This persistence of abnormal frequency that can be controlled by the use of génatropine would seem to be due to variable excessive sensitivity of the trigone and the neck of the bladder.

Ileoplasty for enlargement, however, often has more beneficial effects than just the expected reduction of pollakiuria: disappearance of existing dysuria depends on supplemental resection of the constricted posterior lip of the vesical neck; disappearance of bladder pains; in addition, in certain patients there may be disappearance of incontinence due to excessive pressure of the urine contained in the contracted bladder, which forces the sphincters. After ileoplasty, incontinence disappears because hypertension of the urine disappears and the urine can be diffused within a large and supple iliac loop; the neck of the bladder contracts and regains continence. Sometimes it contracts too much; several of my patients eventually had to submit to transurethral resection of the vesical neck for dysuria.

There is a further beneficial effect:

vesicoureteral reflux ceases. Reflux results from gaping of the ureteral orifice caused by hypertension of urine in a bladder that is too small and cannot become sufficiently distended. This results in stagnation of urine in the ureter, pelvis and calyces—their dilatation, ureterohydronephrosis, progressive destruction of renal parenchyma and finally death. The ileoplasty, in eliminating reflux, permits the kidney to return to normal function, provided the changes are not too advanced. Some of my patients in whom the condition was irreversible were operated on too late and did not benefit. In others, however, renal function became normal, as was demonstrated by recheck urograms, and there was also an improvement in general health.

Ileoplasty for enlargement is followed not only by improved vesical function but by favorable results in those vital organs, the kidneys. Favorable influence of this operation on the kidney can be obtained only in cases of reflux in which there is a forced ureter. In rare instances, in which there is stricture of the terminal portion of the ureter (8 of my cases), correction of the ureterohydronephrosis, thereby protecting the kidney, necessitated section of the ureter above the stenosed area and its reimplantation into the iliac loop. My impression of ureteroileocystoplasty is quite favorable; ureteroiliac anastomosis does not seem to have a tendency toward stenosis.

I also used ureteroileocystoplasty in 3 cases to correct cutaneous ureterostomy (R. Couvelaire).

The beneficial effects on the kidney of ileocystoplasty for enlargement of contracted bladders prompted me to apply ileoplasty to the treatment of vesicoureteral reflux, which follows certain nephrectomies unaccompanied by the troublesome symptoms of cystitis. In every instance (9 patients) I obtained regression

plete urinary incontinence following denervation of the bladder caused by radical hysterectomy and lymphadenectomy. Replacement of the vesical detrusor by an iliac detrusor resulted in almost complete cure.

About a year ago I performed the same plastic operation for substitution in a case of paraplegia following meningomyelitis. The intense dysuria and pollakiuria were corrected, incontinence disappeared during the day but persisted at night.

Two other patients had meningocele with extremely painful vesical symptoms. They were operated on only a few months ago. In 1 the result is excellent during the day but incontinence persists at night; in the other, although I did not obtain a good result, there is great amelioration of the symptoms.

In the last of these 5 patients, whose symptoms were of obscure neurogenic origin, an excellent result was obtained, but the case is too recent for evaluation.

It is my conviction, therefore, that vesical disturbances of neurogenic origin, i.e., those not resulting from contracture of the vesical neck but rather due to faulty function and lack of tone of the detrusor, can in certain instances be cured or improved by ileocystoplasty for substitution. This operation should take its place among operations on the nerves of the bladder. It can complement or replace the denervation operation, which I discarded long ago because of unfavorable results.

5. I attempted to replace the bladder in 3 patients who, after hysterectomy and lymphadenectomy, presented (among other mutilations) advanced vesicovaginal fistula. It was impossible to close the fistula in the contracted and sclerosed bladder by suture. In these cases I resected the bladder, leaving intact the neck and as much as possible of the trigone, with or without reimplantation of the ureters in the iliac loop. Up to the time of writing

I have not had one valid result. Of these 3 patients, 1 died, the condition of 1 was ameliorated, and the case of the third is too recent for evaluation.

6. I performed ileocystoplasty for the following new but questionable indication: The patient presented congenital dysuria. Both transurethral and retropubic resection of the vesical neck had failed, as was evidenced by persistence of dysuria, incontinence and chronic in complete retention of urine in the bladder; the detrusor muscle was enlarged, thickened and atonic. Subtotal cystectomy for removal of the detrusor might have been sufficient, but I complemented it by ileocystoplasty. It is too soon to evaluate results, as the operation was only recently performed.

7. The last 3 cases I shall mention concern ileoplasty for replacement of one or both ureters.

In the first, an operative death resulted; the patient died because of renal insufficiency following replacement of left megaloureter by anastomosis of the ileum to the pelvis and to the bladder (nephrotomy of the right kidney had been previously carried out and the opposite kidney was nonfunctioning).

In the other 2 patients (women) left ureterovaginal fistula and stenosis of the right pelvic ureter had developed after hysterectomy and lymphadenectomy. In these patients I divided both ureters above the iliac vessels and, not being able to dissect them any lower because of sclerosis of the pelvis, implanted them in the branches of a U-shaped iliac loop anastomosed to the bladder at the concave surface. In the first case it became necessary to perform right nephrectomy, as the thin-walled right ureter had been torn during the ureteroiliac anastomosis. Both patients were operated upon less than a year prior to the time of writing. Careful recent clinical and roentgenographic rechecks

The obvious difficulties in the way of fixation in a ward immediately after death led to an investigation of the length of time which elapses before autolysis commences in the gastric mucosa. Stomachs were fixed at 15 minute intervals up to two hours after death. In the majority of cases, autolysis commenced 30-40 minutes after death. Autopsy material reaching the mortuary two hours after death is of limited value therefore.

Partial gastrectomy specimens were obtained immediately after removal by the surgeon, opened along the greater curvature, pinned out on a board and placed in fixative. The foetal stomachs were obtained as soon as possible but autolysis occurs in these very much more slowly than in the adult stomach.

Strips, about 2 cm. in width, were taken from the anterior and posterior walls and from the whole of the lesser curvature of each stomach. Strips, 10-15 cm. in length, were rolled up, after fixation, like a Swiss roll and in this way a large area of the stomach was included in one section. In addition, longitudinal sections were taken through the pyloric and cardiac orifices and a transverse section through any ulcer present. Any available duodenum was sectioned as well. In this way 8-12 strips of mucosa were taken from each stomach.

Paraffin blocks were made of the material thus obtained and sections were stained by the following methods—1. Haematoxylin and eosin. 2. Mallory's phosphotungstic acid haematoxylin, using mucicarmine as a counterstain. 3. Masson's silver method for argentaffin cells. As pointed out by Kerr and Lendrum (1935-36) Mallory's phosphotungstic acid haematoxylin stains the granules of Paneth cells specifically and has also the advantage that mucicarmine can be used as a counterstain to demonstrate goblet cells. Paraffin sections, taken down to water, were stained with phosphotungstic acid haematoxylin for eight hours. The sections were then washed in running tap water for 15-30 minutes and, after rinsing with 50 per cent alcohol, were placed in mucicarmine for twelve hours. They were then washed quickly with tap water, cleared and mounted. The large granules of the Paneth cells stain a deep purple colour.

The following modification of Mayer's mucicarmine method gave the best results.

Carmine rubra opt (Grübler)	1 g
Pure aluminium chloride	0.5 g
Aq. dest.	2 c.c.

were ground up in a mortar with a pestle whilst 100 c.c. of 50 per cent alcohol were slowly added. The solution was brought to the boil and, when cold, filtered five or six times to remove any undissolved mucicarmine. The stain was then used full strength.

Kerr and Lendrum also recommend Hitchcock and Ehrlich's (1930) mixture of malachite green and acridine red for the demonstration of Paneth cells in formalin fixed material provided sections be treated first with 1 per cent acetic acid for ten minutes. By this method the granules of the Paneth cells are stained a bright green, whilst the cytoplasm is uniformly pink in colour.

Argentaffin cells were demonstrated by Masson's silver impregnation method (1923).

The identification of intestinal epithelium

Before discussing the results obtained it is necessary to define certain criteria for the identification of intestinal epithelium in

nicos es difícil de prever, pero parece que la tendencia a la estenosis es mucho menor con implantaciones en el íleon que en el sigmoide.

En el presente puede decirse que el transplante de íleon ha contribuido al progreso en el campo de la cirugía urológica conservadora. Ha adquirido un lugar en la terapéutica y probablemente pueda utilizarse para ayudar a resolver muchos otros problemas aún sin solución.

SCHLUSSFOLGERUNGEN

Bezüglich der Dünndarmtransplantate als Harnblasenersatz gelangt der Verfasser zu folgenden Schlüssen:

Die Operation ist verhältnismässig harmlos, vorausgesetzt dass eine ausreichende Nierenfunktion besteht. (Wenn sie ungenügend ist, lässt sie sich durch entsprechende Vorbereitung wiederherstellen).

Die Funktion der Dünndarmblase ist ausreichend, vorausgesetzt dass das Trigonum intakt geblieben ist.

Der Einfluss der Dünndarmblasenplastik auf die Nierenfunktion in Fällen von Harnrückfluss ist günstig, ähnlich dem Einfluss der Harnleiter-Dünndarm-Blasenplastik in Fällen von Harnleiterverengung.

Gewöhnlich treten keine Symptome als Folge von Rückabsorption der Elektrolyte des Harnes auf. (Nur einer der Kranken des Verfassers zeigte eine klinisch erkennbare hyperchromische Azidose, die durch medizinische Behandlung ausgeglichen wurde).

Es ist schwer, über die Zukunft der Harnleitereinpflanzung in den Dünndarm Voraussagen zu machen, es besteht jedoch der Anschein, dass die Neigung zu Harnleiterverengungen bei Einpflanzungen in den Dünndarm geringer ist als bei

Einpflanzungen in das Sigmoideum.

Im Augenblick lässt sich mit Recht behaupten, dass das Dünndarmtransplantat zu den Fortschritten auf dem Gebiete der konservativen urologischen Chirurgie gehört. Es hat sich einen Platz in der Therapie erobert und lässt sich wahrscheinlich zur Lösung mancher noch in der Schwebe befindlichen Probleme verwenden.

CONCLUSIONS

L'auteur arrive aux conclusions suivantes concernant la greffe iliaque:

L'opération est relativement bénigne, à condition que la fonction rénale soit suffisante (dans le cas contraire, elle peut être ré-établie par une préparation adéquate).

La fonction de la vessie iliaque est satisfaisante, à condition que le trigone ait été maintenu intact.

L'action de l'ilio-cystoplastie sur la fonction rénale dans les cas de reflux est favorable, comme l'est celle de l'urétéro-ilio-cystoplastie dans les cas de ptose rénale.

Le syndrome humoral de réabsorption des électrolytes urinaux fait habituellement défaut (l'auteur a eu un seul malade présentant de l'acidose hyperchrome, cliniquement décelable, symptôme qui a cédé à un traitement médical).

Il est difficile de prévoir l'avenir de l'implantation urétéro-iliaque, mais il semble probable que la tendance à la sténose est bien moindre avec les implantations dans l'íleon que dans le sigmoïde.

L'on peut actuellement dire avec raison que la greffe iliaque a contribué aux progrès réalisés dans le domaine de la chirurgie urologique conservatrice. Elle a conquis sa place dans la thérapeutique et peut probablement être utilisée aux fins d'aider à résoudre plus d'un problème encore en suspens.

In my material argentaffine cells have been found very occasionally (about one cell per section) amongst the cells lining the pyloric and body glands in both foetal and normal adult stomachs in which intestinal epithelium was absent. They were very numerous when islets of intestinal epithelium were present.

Whilst, therefore, the presence of argentaffine cells cannot be regarded as specific for intestinal epithelium their occurrence, in large numbers, in the islets of intestinal epithelium found in the stomach gives additional support to the statement that this epithelium is identical with true intestinal epithelium.

THE OCCURRENCE OF INTESTINAL EPITHELIUM IN THE GASTRIC MUCOSA

One hundred partial gastrectomy specimens, ten post-mortem stomachs and twelve foetal stomachs have been examined. The resected stomachs were removed for simple or malignant ulcer or for duodenal ulcer and table I gives details of resected stomachs. It shows that intestinal epithelium was present in 59 out of the 100 specimens examined, most often in association with gastric ulcer and least frequently with duodenal ulcer.

TABLE I

Frequency of intestinal epithelium in the mucosa of resected stomachs

	Number of specimens	Frequency of intestinal epithelium.	
		Number	Per cent
Gastric ulcer	40	34	73.9
Malignant ulcer	25	15	60.0
Ulcer cancer	8	4	50.0
Duodenal ulcer	10	2	20.0
One or more scars of healed ulcers but no active ulcer present	11	4	36.3

Heyrovsky (1912) found intestinal epithelium in 14.2 per cent of stomachs removed for simple ulcer but he does not state how much mucosa was examined. Chuma (1923) examined large areas of mucosa from 38 stomachs resected for ulcer or carcinoma and found intestinal epithelium in 70 per cent. As already pointed out Puhl found it in 100 per cent and Taylor in 11 per cent of specimens resected for simple ulcer but again the amount of mucosa examined in each case differed greatly. Konjetzny (1928) found intestinal epithelium in 100 per cent of specimens removed for carcinoma.

Of some interest also is the size of the islands of epithelium found. In table II an attempt has been made to estimate the amount of intestinal epithelium found in each group of cases. In

agar by the pour plate technic. The quantitative plates were incubated at 37 C., and results were read after twenty-four and forty-eight hours' incubation. For qualitative bacteriologic study, one 4 mm. loop of all macroscopically turbid specimens was streaked in duplicate directly on trypticase soy blood agar plates (5 per cent defibrinated horse blood) and eosin-methylene blue-agar (E.M.B.) plates (Levine). All clear specimens after removal of the 0.1 ml. portions for quantitative study were centrifuged at 2,500 rpm for ten minutes. The centrifugate was streaked onto the same media as above.

A Furadantin diagnostic tablet (10 mg.), a tetracycline (2.5 mcg.) and a streptomycin (2.5 mcg.) wet filter paper disk⁴ were placed on the site of initial streaking on each blood agar plate. One set of blood agar plates and one set of E.M.B. plates were incubated aerobically at 37 C. for twenty-four hours, and the other set of each media was incubated under strict anaerobic conditions.⁵

Quantitative plate counts were made and recorded on a basis of total organisms per milliliter, regardless of species. Generic and species identification was made on a basis of cultural, morphologic and biochemical studies. The media of King and his associates⁶ were used for *Pseudomonas*

aeruginosa and fluorescens differentiation. Enterococci were differentiated from hemolytic, nonhemolytic and viridans streptococci by inoculation into trypticase soy broth containing 6.5 per cent sodium chloride and by mannitol fermentation. *Proteus* was identified by the use of the urease test.⁷ *Paracolon* species were identified on the basis of latent (ten to thirty days) lactose fermentation. Diphtheroids were identified by cultural growth and gram stain morphologic studies.

Susceptibility Testing.—A composite broth culture for Furadantin serial tube dilution susceptibility testing was made by picking three separate colonies of each species from each blood agar plate showing growth. These cultures were also used to reevaluate the initial Furadantin disk test and to determine the susceptibility of the isolates by the wet disk technic to tetracycline, chlortetracycline, oxytetracycline, chloramphenicol, neomycin and polymyxin.

The test tube susceptibility test for Furadantin was that previously described.⁸ Serial tube dilution susceptibilities were not studied with the other antibiotics. Interpretation of the disk results was based on data previously published by one of the authors.^{4b}

Assay.—The assay of Furadantin in urine after institution of therapy was done primarily by using a bio-assay Oxford cup technic. Good correlation with this method for Furadantin in the urine specimens was obtained with the spectrophotometric method of Paul.⁹ Quantitation was not of the same order as reported by Paul,⁹ however, since the total output of urine for these patients was not determined. The presence or absence of Furadantin by bio-assay was considered significant. It is assumed that urine levels above those to be reported were present during therapy. Since the patients were not hospitalized, however, the Furadantin levels are in

TABLE 1.—Organisms and Their Susceptibility *In Vitro* to Furadantin in Patients with a Single Infection

Species	Total No.	Susceptible %	Resistant, %
<i>E. coli</i>	25	24 (96)	1 (4)
<i>A. aerogenes</i>	18	9 (50)	9 (50)
<i>Proteus</i> species	11	9 (81.8)	2 (18.2)
<i>Pseudomonas</i> species	4	0 (—)	4 (100)
<i>Ps. aeruginosa</i>	3	0 (—)	3 (100)
Enterococci	4	4 (100)	0 (—)
<i>Paracolon</i> species	1	0 (—)	1 (100)
Total	66	46 (69.7)	20 (30.3)

agar by the pour plate technic. The quantitative plates were incubated at 37 C., and results were read after twenty-four and forty-eight hours' incubation. For qualitative bacteriologic study, one 4 mm. loop of all macroscopically turbid specimens was streaked in duplicate directly on trypticase soy blood agar plates (5 per cent defibrinated horse blood) and eosin-methylene blue-agar (E.M.B.) plates (Levine). All clear specimens after removal of the 0.1 ml. portions for quantitative study were centrifuged at 2,500 rpm for ten minutes. The centrifugate was streaked onto the same media as above.

A Furadantin diagnostic tablet (10 mg.), a tetracycline (2.5 mcg.) and a streptomycin (2.5 mcg.) wet filter paper disk⁴ were placed on the site of initial streaking on each blood agar plate. One set of blood agar plates and one set of E.M.B. plates were incubated aerobically at 37 C. for twenty-four hours, and the other set of each media was incubated under strict anaerobic conditions.⁵

Quantitative plate counts were made and recorded on a basis of total organisms per milliliter, regardless of species. Generic and species identification was made on a basis of cultural, morphologic and biochemical studies. The media of King and his associates⁶ were used for *Pseudomonas*

aeruginosa and fluorescens differentiation. Enterococci were differentiated from hemolytic, nonhemolytic and viridans streptococci by inoculation into trypticase soy broth containing 6.5 per cent sodium chloride and by mannitol fermentation. *Proteus* was identified by the use of the urease test.⁷ Paracolon species were identified on the basis of latent (ten to thirty days) lactose fermentation. Diphtheroids were identified by cultural growth and gram stain morphologic studies.

Susceptibility Testing.—A composite broth culture for Furadantin serial tube dilution susceptibility testing was made by picking three separate colonies of each species from each blood agar plate showing growth. These cultures were also used to reevaluate the initial Furadantin disk test and to determine the susceptibility of the isolates by the wet disk technic to tetracycline, chlortetracycline, oxytetracycline, chloramphenicol, neomycin and polymyxin.

The test tube susceptibility test for Furadantin was that previously described.⁸ Serial tube dilution susceptibilities were not studied with the other antibiotics. Interpretation of the disk results was based on data previously published by one of the authors.¹⁰

Assay.—The assay of Furadantin in urine after institution of therapy was done primarily by using a bio-assay Oxford cup technic. Good correlation with this method for Furadantin in the urine specimens was obtained with the spectrophotometric method of Paul.⁹ Quantitation was not of the same order as reported by Paul,⁹ however, since the total output of urine for these patients was not determined. The presence or absence of Furadantin by bio-assay was considered significant. It is assumed that urine levels above those to be reported were present during therapy. Since the patients were not hospitalized, however, the Furadantin levels are in

TABLE 1.—Organisms and Their Susceptibility in Vitro to Furadantin in Patients with a Single Infection

Species	Total No.	Susceptible %	Resistant, %
<i>E. coli</i>	25	24 (96)	1 (4)
<i>A. aerogenes</i>	18	9 (50)	9 (50)
<i>Proteus</i> species	11	9 (81.8)	2 (18.2)
<i>Pseudomonas</i> species	4	0 (—)	4 (100)
<i>Ps. aeruginosa</i>	3	0 (—)	3 (100)
Enterococci	4	4 (100)	0 (—)
<i>Paracolon</i> species	1	0 (—)	1 (100)
Total	66	46 (69.7)	20 (30.3)

of allergic toxicity with Furadantin, eosinophil counts were made on a series of patients undergoing therapy.

Dosage.—The dose of Furadantin used was 100 mg. four times daily. A maximum dosage of 200 mg. four times a day was given to 2 patients over a period of ten days.

Evaluation.—Patients were considered cured when they were clinically free of symptoms and when five bacteriologic cultures, taken at weekly intervals after discontinuance of the drug, were negative.

Laboratory and Clinical Studies.—The laboratory and clinical results are reported in terms of the bacteriologic observations, as follows:

1. Patients on whom only 1 significant bacterial species was isolated at any time.

2. Patients in whom 2 significant different bacterial species were isolated, either on the first urine culture or during the course of the study.

3. Patients in whom 3 significant different bacterial species were initially isolated, or during their course of study.

4. Patients in whom 4 significant different bacterial species were initially isolated, or during their course of study.

Table 1 presents the data on 66 patients from whom a single microorganism was isolated. The species and their susceptibility to Furadantin are given in the table.

TABLE 4.—Patients Infected with Two* Different Bacterial Species

Species	No. of Cases	Urine Assay		Organisms Res.	Patient Rx Sus.	Patient Rx Intolerant	Bacterial Cure		Clinical Cure		Comment
		+	—				+	—	+	—	
A. aerogenes Proteus sp.	4	4	0	2	2	0	2	2	3	1	One resistant <i>Proteus</i> in 2 cases, no bacterial cure. Clinical cure in one case with resistant organism
A. aerogenes E. coli	8	6	2	4	4	1	4	4	5	3	1 patient refractory to therapy. 3 patients with resistant organism. One patient with resistant organism had bacterial and clinical cure
A. aerogenes Pseudomonas sp.	1	1	0	1	0	0	0	1	0	1	
E. coli Proteus sp.	2	1	1	0	2	0	1	1	1	1	1 patient treated one week
E. coli Enterococci	3	2	1	0	3	0	1	2	1	2	1, no assay at any time, though organism susceptible. 1, last specimen, Enterococci present, no assay obtained
A. aerogenes Enterococci	1	1	0	0	1	0	1	0	1	0	Patient intolerant to therapy
Pseudomonas sp. Enterococci	1	1	0	1**	0	0	1	0	1	0	
Pseudomonas sp. E. coli	1	1	0	1	0	1	0	1	0	1	
Total	21	17	4	9	12	2	10	11	12	9	

*More than 1 organism isolated some time during treatment, not necessarily simultaneous infection.
 **Though a resistant *Pseudomonas* species was present, therapy was effective.

TABLE 5.—Patients Infected with Three Bacterial Species

Species	No. of Cases	Urine Assay		Organisms		Bacterial Cure		Clinical Cure		Comment
		+	—	Res.	Sus.	+	—	+	—	
A. aerogenes Proteus sp. Paracolobactrum sp.	1	1	0	0	x	0	1	0	1	Negative cure may be due to resistant Paracolobactrum species
A. aerogenes E. coli Pseudomonas sp.	2	2	0	1	1	1	1	1	1	1 patient bacteriologically and clinically cured, though resistant E. coli and Pseudomonas were isolated; other patient not cured though only a Pseudomonas was isolated
A. aerogenes E. coli Paracolobactrum sp.	1	1	0	x	0	1	0	1	0	Resistant A. aerogenes, but cure was effective
A. aerogenes Paracolobactrum sp. Pseudomonas sp.	1	1	0	0	x	1	0	1	0	Susceptibility of these organisms 15-30 mg./100 ml.
A. aerogenes Enterococci Paracolobactrum sp.	1	1	0	0	x	1	0	1	0	
A. aerogenes Paracolobactrum sp. Ps. aeruginosa	1	1	0	x	0	0	1	0	1	
A. aerogenes E. coli Proteus sp.	1	1	0	0	x	1	0	1	0	
Total	8	8	0			5	3	5	3	

more, a favorable response to therapy would not occur. The results from this study indicate that this assumption is true. It has also been observed in this study, however, that in a few instances a bacteriologic and clinical cure may result even though the organism is considered resistant by the *in vitro* test. This may indicate that when, for any possible reason, the drug of choice cannot be used, therapeutic trial may result in cure despite the *in vitro* resistance. This phenomenon has been observed in antibiotic therapy. It is rare, and in our opinion *in vitro* susceptibility tests are generally a good guide to effective therapy. Clinical and bacteriologic cure was not effected in all instances when organisms were in a high susceptibility range. In a few instances, however, cure with Furadantin occurred in the presence of *in vitro* resistant organisms. It is to be pointed out that absolute *in vitro-in vivo*

susceptibility correlation does not occur.

There are other unexplained factors involved in the complex interplay between patient, microorganisms and chemotherapy. It is not the purpose of this study to present the scientific or hypothetical explanations.

Table 3 summarizes the negative therapeutic results in the 24 cases from which a single bacterial species was isolated.

The reasons are obvious why the 24 patients with a single species did not respond favorably to therapy except in 1 instance of E. coli infection. In this single instance the organism was susceptible, but the Furadantin urine assay was negative.

The organism originally isolated from this patient, a girl 10 years old, was E. coli susceptible to 1.8 to 3.75 mg. per hundred milliliters of Furadantin. After therapy for one and one-half weeks the patient was clinically free of symptoms and the urine

same as the initial strain. This increase in drug tolerance is definitely of a low order in relation to the prolonged period of therapy.

In the other instance of clinical cure with two different bacterial species, 1 of which was resistant *in vitro* to Furadantin, the two species were an *in vitro* susceptible *E. coli* and an *in vitro* resistant *A. aerogenes*. This patient was given continued therapy for six weeks. The *E. coli* was eliminated, but the *A. aerogenes* persisted. The resistance of the species oscillated between 15 and 30 mg. per hundred milliliters. Because of the Furadantin resistance of this microorganism *in vitro*, the patient was given sulfisoxazole for four weeks. During this time the *in vitro* Furadantin-resistant *A. aerogenes* disappeared from the urine, but an *in vitro* Furadantin-susceptible *E. coli* reappeared. The patient was again given Furadantin therapy for two weeks, at the end of which time the urine was free of *E. coli*, but small numbers (less than 100 microorganisms per milliliter) of micrococci appeared in the urine. On the final bacteriologic evaluation of the urine, the *in vitro* Furadantin-susceptible *E. coli* again reappeared in the urine. At that time the patient was clinically free of symptoms. This case is included in the series because of the reappearance of organisms and the initial and ultimate effect of Furadantin, which can be assumed to be partially responsible for cure. One cannot deny the

possibility that, if sulfisoxazole alone had been used in this single case, effective therapy could have resulted.

It is interesting to note that, in this series, bacteriologic and clinical cure was effected with 1 patient from whom enterococci, susceptible *in vitro* to Furadantin, and an *in vitro* resistant *Pseudomonas* species, other than *aeruginosa*, were isolated.

Of 21 patients with infections with two different bacterial species, clinical cure was effected in 57.1 per cent of the cases and bacteriologic cure in 47.6 per cent. In 1 instance there was a clinical cure but no bacteriologic cure.

Table 5 presents the data on 8 patients. Three different bacterial species were isolated from each. Of the 8 patients, clinical and bacteriologic cure was effected in 5 (62.5 per cent). Statistically these data are possibly not too significant, because of the limited number of cases. The effectiveness of Furadantin, however, is exemplified. In this series 1 patient with *in vitro* resistant *E. coli* and *Pseudomonas* species responded favorably to therapy. Also, cure was effected in 1 patient in whom 2 of the species, an *E. coli* and a *Paracolbactrum* sp. were susceptible *in vitro*, and one, an *A. aerogenes*, was resistant *in vitro* to Furadantin.

Table 6 presents the data on 5 patients, from whom 4 different bacterial species were isolated. In 2 of the 5, clinical and bacteriologic cure was effected. In 1 in-

TABLE 7.—Summary of Data on 100 Patients Treated with Furadantin

Type of Infection	No. of Cases	Cure Bacterial	Cure Clinical	Urine Assay Positive	Urine Assay Negative	% Cure Bacterial	% Cure Clinical	Refractory to Therapy	Organisms Resistant <i>in Vitro</i> , No. of Cases
1 species	66	42	42	50	16	63.6	63.6	4	19
2 species	21	10	12	17	4	47.9	57.1	2	9
3 species	8	5	5	8	0	62.5	62.5	0	6
4 species	5	2	2	5	0	40.0	40.0	0	4
Total	100	59	61	80	20	59.0	61.0	6	38

THE ASSOCIATION BETWEEN INTESTINAL EPITHELIUM AND ATROPHIC GASTRITIS

In the material examined intestinal epithelium was found only in association with atrophic gastritis, never with healthy gastric mucosa. The diagnosis of atrophic gastritis is based on the following considerations.

The stomach is divided, anatomically, into the body mucosa, which occupies the upper two-thirds, and the pyloric mucosa, which occupies the lower third. The body mucosa (fig 5) contains the gastric glands proper, with their parietal and chief cells, and the pyloric mucosa contains the pyloric glands, lined by mucus-producing cells (fig 6). The pyloric glands do not contain chief cells although, as pointed out by Berger (1934), an occasional parietal cell may be found.

In a very large proportion of cases, the changes of gastritis are localised to the mucosa of the pyloric antrum and perhaps the lower inch of the body mucosa, whilst the rest of the stomach is normal. The most striking change is a great reduction in the number of glands present in the affected mucosa. This reduction may be extreme, as in fig 7, but as a rule a considerable number of glands remains. These are not packed tightly together as in normal mucosa but are widely separated by connective tissue intensely infiltrated by plasma cells, lymphocytes, eosinophils and, frequently, Russel's bodies. In some cases the lymphocytes are collected together to form numerous large lymph follicles which rest on the muscularis mucosæ—chronic follicular gastritis (fig 9). The cells lining the surviving glands may be normal or in various stages of degeneration and occasionally many of the glands are dilated to form cysts (fig 10). In affected body mucosa the degenerate cells lining the glands are sometimes replaced by mucus-producing cells identical with those lining the pyloric glands which they closely resemble so that they have been called "pseudo-pyloric" glands (fig 11).

The surface epithelium frequently shows striking changes. If the gastritis is quiescent it may be normal. During an exacerbation its cells become cubical in shape with granular cytoplasm and hyperchromatic nuclei and mitotic figures are numerous. The epithelium then consists of several layers of cells the walls of which are seen with difficulty so that a syncytium is suggested. Polymorphs appear in the lamina propria of the mucosa, pass to the surface epithelium and reach the lumen of the stomach. This migration of polymorphs through the surface epithelium is brought about by the appearance of vacuoles between the cells through which the polymorphs pass (fig 12). In addition the muscularis mucosæ is frequently thickened and there may be an increase in

an initial infection with more than 1 bacterial species or who had acquired a recurrent infection with a species resistant *in vitro* to Furadantin. Since the *in vitro* resistant organisms in the patients from whom more than 1 species were isolated were either present on the initial culture prior to therapy or occurred as a single species after therapy had eradicated the initial susceptible species, we consider that there is no relation between the therapy and the appearance of resistant organisms. The development of resistance *in vivo* by any of the species originally isolated and sensitive to Furadantin was of minimal order and limited in 2 cases.

In patients with a single infection the cure rate, 63.6 per cent, is in keeping with data previously reported.

The Relation of Routine Urinalysis to the Culture of Urine.—Routine urinalysis has long been accepted by urologists as a guide to infection or therapeutic cure. In this study of 100 unselected patients with uncomplicated infection of the urinary tract, 1,102 urine specimens were analyzed by routine urinalysis and also by bacteriologic culture. The correlation between the routine urinalysis and the bacteriologic cultural findings on 511 specimens is presented in Table 8.

Table 8 presents data comparing the gross macroscopic appearance of the urine as routinely observed and the positive bacterial cultures.

Ninety-eight (19.12 per cent) of the 511 specimens were macroscopically clear. Sixty-six (67.3 per cent) of the 98 clear specimens were negative on culture. Thir-

TABLE 10.—Comparison of the Presence of Leukocytes per High Power Field and the Bacteriologic-Cultural Data

Total no. of specimens	511
Positive for leukocytes	460 (90.1%)
Negative for leukocytes	51 (9.9%)
Positive for bacteria by culture	328 (64.2%)
Negative for bacteria by culture	183 (35.8%)

TABLE 11.—Relation of Presence of Leukocytes to Bacteriologic-Cultural Observations

Total no. positive for leukocytes	460
Positive for leukocytes and bacteria	305 (66.3%)
Negative for bacteria, positive for leukocytes	155 (33.7%)
Total no. negative for leukocytes	51
Negative for leukocytes, positive for bacteria	22 (43.1%)
Negative for leukocytes and bacteria	29 (56.9%)

ty-two (32.1 per cent) of the 98 specimens were positive on culture. The number of bacteria per milliliter of urine in the positive specimens ranged from less than 100 to more than 100,000.

Four hundred and thirteen (80.9 per cent) of the 511 specimens were macroscopically cloudy. One hundred and seventeen (22.9 per cent) of the cloudy specimens were negative for bacteria. Two hundred and ninety-six (57.9 per cent) of the cloudy specimens were positive for bacteria.

From the foregoing data it is indicated that the cloudy specimen is a good index that microorganisms are present in the urine. The clear urine so often considered

TABLE 12.—Relation of the Incidence of Leukocytes per High Power Field and the Bacteriologic-Cultural Data

Leukocytes 0-10		Leukocytes 10 plus		Less than 10 Leukocytes with Clumps		More than 10 Leukocytes with Clumps		Total No. of Specimens
Bact. +	Bact. —	Bact. +	Bact. —	Bact. +	Bact. —	Bact. +	Bact. —	
162	177	95	5	7	2	72	1	511

If intestinal epithelium were only found in the stomach near to the pylorus it might be possible to explain its presence on the assumption that the transition from gastric to intestinal epithelium was an irregular and not an abrupt process. Islets are found, however, throughout the pyloric antrum and, in cases of diffuse atrophic gastritis, throughout the stomach. In two out of the one hundred resected stomachs examined the entire gastric mucosa included in the specimens had been replaced by intestinal epithelium.

In order to ascertain whether or not a stomach is normal large areas of mucosa from all parts must be examined. Sachs, as long ago as 1887-88, pointed out that intestinal epithelium only occurred in pathological and never in normal stomachs. Since that time all investigators who have examined large areas of mucosa from many stomachs, both post-mortem and resected, are agreed that intestinal epithelium never occurs in a normal stomach, i.e. one free from the changes of gastritis (Schmidt, 1896, Faber and Langé, 1908, Chuma, 1923, Konjetzny, 1928, Hamperl, 1928, and many others).

One of the major difficulties in accepting the idea that intestinal epithelium results from the faulty regeneration of gastric epithelium damaged by repeated attacks of inflammation is that the heterotopic epithelium is apparently a specialised tissue and identical in every way with the epithelium of the intestine. Lubarsch (1897) regards the gastric mucosa as a specialised type of intestinal epithelium and explains the occurrence of the latter in the stomach as a reversion to a simpler type. Gastritis is essentially a condition which occurs in waves, each exacerbation doing a little more damage to both the surface epithelium and the glands. Each time erosions are produced the surface epithelium has to repair them by rapid multiplication of its cells but eventually the regeneration centres in the pits of the surface epithelium become exhausted and produce a less specialised epithelium. Moszkowicz (1922-23), whilst pointing out that intestinal epithelium results from the faulty regeneration of damaged surface epithelium, believes that if the inflammatory process subsides normal gastric mucosa may again replace the intestinal epithelium.

Faber (1921) and Konjetzny (1928) both pointed out an association between intestinal epithelium and the severity of the inflammatory changes. My results support this view. Thus in the majority of the stomachs resected for duodenal ulcer there was slight gastritis with moderate atrophy in the pyloric antrum. The intestinal epithelium found in these cases occurred only in the form of small widely scattered islets.

In my opinion therefore the evidence is in favour of the "regeneration" theory. The presence of intestinal epithelium in

therapy. Bacteriologic culture of all urine specimens to confirm the clinical picture in cases of infection of the urinary tract, or to follow the effectiveness of therapy, is strongly recommended.

COMMENT

Treatment with Furadantin in 100 unselected cases of uncomplicated infection of the urinary tract infection has been reported. Bacteriologic and/or clinical cure in 61 per cent of cases confirms the effectiveness, as reported by other clinicians, of this chemotherapeutic agent in treating such infections when they are associated with the microorganisms identified in this study.

Infections of the urinary tract caused by proteus species are generally considered most difficult to treat effectively. A favorable response to Furadantin, however, was effected in certain instances when there were apparent complications with other gram-negative or gram-positive bacterial species. Furadantin was effective not only in infections with a single bacterial species but in infections involving several species, as well as in patients who underwent repeated, recurrent infections caused by different bacterial species.

Side reactions consisted of nausea in 6 patients. This is not considered a serious drawback to the administration of Furadantin. Prompt withdrawal of the drug was quickly followed by disappearance of the nausea.

The generally used dose of 100 mg. of Furadantin every four hours may be continued, with tolerant patients, for an extended period without any untoward manifestations.

It is pointed out from this study that the routine disk susceptibility test should be done coincidentally with the bacteriologic studies. There is an excellent correlation between the *in vitro* susceptibility and the therapeutic results. Using the

presently available 100 mcg. Furadantin disks, a wide zone of clearing (20 mm. or more overall) indicates a highly susceptible microorganism. If the zone of clearing is between 12 and 15 mm. the organism is sensitive, and if the zone of clearing is less than 12 mm. the organism is moderately resistant. The degree of resistance as interpreted does not in itself mean any alteration from the regular 100 mg. schedule. Lack of response of an infection due to an organism susceptible *in vitro* indicates need for increase of the dose to 200 mg. every four hours for a period of ten days, if the patient is tolerant.

It has been demonstrated in this study that a concentration of active Furadantin in the urine as high as 80 mg. per hundred milliliters can be obtained. The susceptibility of most microorganisms isolated in this study was well within this range. It is considered that bacterial species refractory to concentrations above 80 mg. per hundred milliliters will not respond favorably to therapy, but, as has been shown, this does not always hold true.

The use of bacteriologic culture of all urine in the diagnosis and in the follow-up of therapy cannot be too strongly stressed. Diagnosing or evaluating infections of the urinary tract on the sole basis of the macroscopic appearance of the urine can be grossly misleading. Credence based on the report of routine urinalysis and interpretation based on the presence or absence of leukocytes per high power field can be in direct opposition to the true bacterial picture.

SUMMARY

1. Furadantin (N-(5-(nitro-2-furfurylidene)-1-aminohydantoin) was effectively used in the treatment of 61 of 100 patients with uncomplicated clinical infections of the urinary tract.

Bacteriologic studies of the urine of each patient isolated one to four of the

- MASSON P
C R Acad Sci, 1914, cxviii 59
 In Sergeant, Ribadeau - Dumas and
 Babonneix's *Traité de pathologie médi-
 cale et de thérapeutique appliquée Paris*,
 1923, xxvii vol 2, p 702
- MOSZKOWICZ L
Arch Ilm Chir 1922-23, cxviii 444
- NICHOLSON, G W
this Journal, 1936, xliii 209
- PARETH, J
Arch milr Anat, 1888, xxxvi 113
- PUHL, H
Arch path Anat, 1926, cclx 1
- SACHS A
Arch exp Path und Pharmacol, 1887 88,
 xxix 109
- SALTZMAN F
Arb path Inst Univ Helsingf Jena,
 1913
- SCHAFER J
*Vorlesungen der Histologie und Histo-
 genese Leipzig*, 1922
- SCHMIDT A.
Arch path Anat, 1896, cxliii 477
- SCHMIDT, J E
Arch milr Anat, 1905, lxxvi 12
- SCHWALBE, G
Ibid, 1872, viii 92
- STEWART M J
 In Hurst and Stewart's *Gastric and duo-
 denal ulcer London*, 1929, p 131
- TAYLOR A L
this Journal, 1927, xxx 415

therapy. Bacteriologic culture of all urine specimens to confirm the clinical picture in cases of infection of the urinary tract, or to follow the effectiveness of therapy, is strongly recommended.

COMMENT

Treatment with Furadantin in 100 unselected cases of uncomplicated infection of the urinary tract infection has been reported. Bacteriologic and/or clinical cure in 61 per cent of cases confirms the effectiveness, as reported by other clinicians, of this chemotherapeutic agent in treating such infections when they are associated with the microorganisms identified in this study.

Infections of the urinary tract caused by proteus species are generally considered most difficult to treat effectively. A favorable response to Furadantin, however, was effected in certain instances when there were apparent complications with other gram-negative or gram-positive bacterial species. Furadantin was effective not only in infections with a single bacterial species but in infections involving several species, as well as in patients who underwent repeated, recurrent infections caused by different bacterial species.

Side reactions consisted of nausea in 6 patients. This is not considered a serious drawback to the administration of Furadantin. Prompt withdrawal of the drug was quickly followed by disappearance of the nausea.

The generally used dose of 100 mg. of Furadantin every four hours may be continued, with tolerant patients, for an extended period without any untoward manifestations.

It is pointed out from this study that the routine disk susceptibility test should be done coincidentally with the bacteriologic studies. There is an excellent correlation between the *in vitro* susceptibility and the therapeutic results. Using the

presently available 100 mcg. Furadantin disks, a wide zone of clearing (20 mm. or more overall) indicates a highly susceptible microorganism. If the zone of clearing is between 12 and 15 mm. the organism is sensitive, and if the zone of clearing is less than 12 mm. the organism is moderately resistant. The degree of resistance as interpreted does not in itself mean any alteration from the regular 100 mg. schedule. Lack of response of an infection due to an organism susceptible *in vitro* indicates need for increase of the dose to 200 mg. every four hours for a period of ten days, if the patient is tolerant.

It has been demonstrated in this study that a concentration of active Furadantin in the urine as high as 30 mg. per hundred milliliters can be obtained. The susceptibility of most microorganisms isolated in this study was well within this range. It is considered that bacterial species refractory to concentrations above 30 mg. per hundred milliliters will not respond favorably to therapy, but, as has been shown, this does not always hold true.

The use of bacteriologic culture of all urine in the diagnosis and in the follow-up of therapy cannot be too strongly stressed. Diagnosing or evaluating infections of the urinary tract on the sole basis of the macroscopic appearance of the urine can be grossly misleading. Credence based on the report of routine urinalysis and interpretation based on the presence or absence of leukocytes per high power field can be in direct opposition to the true bacterial picture.

SUMMARY

1. Furadantin (N-(5-(nitro-2-furfurylidene)-1-aminohydantoin) was effectively used in the treatment of 61 of 100 patients with uncomplicated clinical infection of the urinary tract.

Bacteriologic studies of the urine of each patient isolated one to five

The sera and cerebrospinal fluids were examined, without and with leucocytes, for the presence of protective antibodies. The examination with leucocytes was made, because previous investigations on malaria-treated general paralytics (Hoff and Silberstein, 1925) suggested the existence of spirochætotropins.

Technique

The examination for spirochætocidins was made either with fresh active serum or with inactivated serum to which guinea-pig's complement was added. Following Tan's procedure, decreasing amounts of chancre spirochætes—suspended in 0.2 c.c. of broth—were mixed with a constant volume of active serum (0.8 c.c.) or a mixture of inactivated serum (0.4 c.c.) and guinea-pig's complement (0.4 c.c.). The suspensions of spirochætes were obtained by emulsifying rabbits' chancres (strain Truffi or Nichols), removed aseptically, with about 5 c.c. of sterile broth, filtering and gradually diluting this cleared emulsion with broth to dilutions of 1:1, 1:3, 1:9, 1:27 and 1:81. The content of spirochætes in the undiluted emulsion varied in the different experiments from 5 to 15 spirochætes per field (magnification $\times 950$). The mixtures of serum and the different dilutions of spirochætes were kept for 2 hours at 37° C. and were then injected intracutaneously into the depilated flanks of 2 albino rabbits. The sera of syphilitic rabbits infected with the Truffi strain were tested against the homologous spirochætes, the human sera against spirochætes of either the Truffi or the Nichols strain. As a control, simultaneously with the syphilitic serum, normal rabbits' or human sera were tested with the same technique and on the same animal. The injected animals were inspected weekly and the size and intensity of the resulting lesions recorded.

The examination of serum and leucocytes was made with the same technique, except that the serum was used always in the fresh active state and that the mixtures of serum and the different dilutions of spirochætes were added with 0.4 c.c. of a twice-washed saline suspension of guinea-pig's leucocytes. These were obtained by the usual intraperitoneal injection of concentrated broth and were used in an average density of 40,000 leucocytes per c.mm. The time of incubation of the serum-spirochæte-leucocyte mixture was one hour only.

For simplicity, the results of these experiments are recorded in the following table only according to the relation of the "end-points" of the syphilitic sera to the "end-points" of their corresponding control sera, *i.e.* according to the highest dilutions of spirochætes which still produced syphilitic lesions in the presence of a syphilitic and its control normal serum.

Con el estudio bacteriológico, se aislaron de la orina de cada paciente, de una a cuatro de las siguientes bacterias: *E. coli*, *A. aerogenes*, las especies de *proteus*, especies de enterococos y *Pseudomonas* diferentes de aeruginosa (*Piociánico*).

2. Se observó excelente correlación entre los resultados de los tests de susceptibilidad *in vitro* y los resultados clínicos, con la terapéutica; con pocas excepciones.

3. La confianza en la observación macroscópica rutinaria de la orina o en la incidencia de leucocitos por campo de gran aumento como índice de infección pueden desorientar grandemente.

4. No obstante que hubo 6 casos en los cuales se observó intolerancia al Furadantin, las reacciones fueron siempre ligeros disturbios gastrointestinales. La queja más común fué náusea, que desaparecía rápidamente cuando se suspendía la administración de la droga.

5. No se encontraron reacciones alérgicas al Furadantin en ningún paciente en este estudio.

RÉSUMÉ

1. La Furadantine (N-(5 (nitro-2-furfurylidène)-1-aminohydantoïne) a donné des résultats efficaces dans le traitement de 61% de cas d'infections cliniques simples su système urinaire.

Les examens bactériologiques ont été pratiqués en isolant de l'urine de chaque malade, 1 à 4 des éléments bactériens suivants: *E. coli*, *A. aérogènes*, protéobacilles, entérocoques, et pseudomonadacés autres que les aérogènes (*pyocyaneus*).

2. A peu d'exceptions près une excellente corrélation a été observée entre les tests *in vitro* et les résultats cliniques avec traitement.

3. De grandes erreurs peuvent être commises si l'on se fie aux examens macroscopiques habituels de l'urine ou à l'incidence

des leucocytes en tant qu'indication d'une infection.

4. Malgré 6 cas d'intolérance à la Furadantine, les réactions ont été bénignes et ont consisté en troubles gastro-intestinaux (les nausées, symptôme habituel, ont disparu dès l'interruption du traitement).

5. Aucune sensibilisation à la Furadantine n'a été constatée.

REFERENCES

1. Dodd, M. C., and Stillman, W. B.: The *In Vitro* Bacteriostatic Action of Some Simple Furan Derivatives, *J. Pharm. & Exp. Therapeut.* 82:11 1944.
2. Carroll, G., and Brennan, R. V.: Furadantin, *J. Urol.* 71:650, 1954.
3. (a) Norfleet, M. C. Jr.; Beamer, P. R., and Carpenter, H. M.: Furadantin in Infections of the Genito-Urinary Tract, *J. Urol.* 70:113, 1953. (b) Hasen, B. H., and Moore, T. D.: Nitrofurantoin: A Study *In Vitro* and *In Vivo* in One Hundred Cases of Urinary Infection, *J.A.M.A.* 155:1470, 1954. (c) Traflet, H. M.; Beutner, E. H.; Petronio, J. J.; Lind, H. E., and Correia-Branco, M.: Furadantin in Urinary Tract Infections, *New England J. Med.* 252:383, 1955. (d) Carroll, G.; Brennan, R. V., and Jacques, R.: Furadantin: Human Blood Level and Urinary Concentration, *Southern M. J.* 48:149, 1955.
4. (a) Bondi, A. Jr.; Spaulding, E. H.; Smith, D. E., and Dietz, C. C.: A Routine Method for the Rapid Determination of Susceptibility to Penicillin and other Antibiotics, *M. Science* 213: 221, 1951. (b) Bondi, A. Jr.; Smith, D. E., and Anderson, T. G.: *Antibiotic Agents by Laboratory Methods*, 1951, p. 6.
5. Kolmer, J. A.; Spaulding, E. H., and Robinson, H. W.: *Approved Laboratory Technic*. New York: Appleton, Century, Crofts, Inc. 1951. 5th ed., p. 415.
6. King, E. O.; Ward, M. K., and Raney, D. E.: Two Simple Media for the Demonstration of Pyocyanin and Fluorescein, *J. Lab. & Clin. Med.* 41: 301, 1954.
7. Christensen, W. B.: Urea Decomposition as a Means of Differentiating Proteus and Paracolon Cultures from Each Other and from Salmonella and Shigella Species, *J. Bact.* 52:461, 1946.
8. Anderson, T. G.: A Modification of the Urease Test for Proteus, *Science* 101:470, 1945.
9. Eaton Laboratories, Inc.: *Med. Dept. Bull.* Nos. 18-53, 1953.
10. Paul, H. E.; Austin, F. L.; Paul, M. F., and Ellis, V. R.: Metabolism of the Nitrofurans I. Ultraviolet Absorption Studies of Urinary End-Products After Oral Administration, *J. Biol. Chem.* 180:345, 1949.

greater regularity and distinctness than was observed in these experiments

Besides the above described examinations *in vivo* of the influence of syphilitic serum and leucocytes on spirochaetes, I tried to ascertain the role of phagocytosis in the defence against the syphilis spirochaete by observations *in vitro*. Mixtures of syphilitic rabbits' serum, chancre spirochaetes and leucocytes—derived from the guinea-pig's peritoneum or from cantharidin blisters in rabbits were kept in a paraffin-sealed chamber and on a 37° C hot stage for several hours under dark-ground observation. Under these conditions an active phagocytosis of spirochaetes was never seen. Occasionally a phenomenon was observed which had no relation to phagocytosis, but which in its final effect could be mistaken for it. This consisted in an active boring movement of the spirochaete into the leucocyte. This seemed to be due to a purely accidental contact of the spirochaete with the leucocyte and led to the intake of only a quarter or a half of the spirochaete into the cell. In spite of prolonged observation, a complete penetration of the spirochaete was never observed, though the possibility of this having happened must be admitted. It may be that this phenomenon accounts for those histological pictures which have been described by some authors as a proof of phagocytosis. Although the limitation of such experiments must be admitted, it would at least seem to be improbable from their results, that phagocytosis plays any important role in the defence against the syphilis spirochaete.

DISCUSSION

Theoretically one objection might be raised to the negative result of the antibody examination, namely the possibility of an insufficient specificity of the antigens used. If the syphilis spirochaete varied in its antigenic structure in the way known to occur with the relapsing fever spirochaete or with trypanosomes, the failure to demonstrate antibodies might be due to the unsuitability of the antigens used. But according to observation in man it is not very probable that such a variability of different immunological types of human syphilis spirochaetes occurs. Unlike in rabbits, immunity in man seems to be a "panimmunity" directed against all strains of syphilis spirochaetes (Kolle, 1926). Furthermore the search for antibodies was also negative in sera of rabbits which were tested with the homologous strain and as in a few unpublished experiments with spirochaetes from their own chancres.

In view of the results described it is maintained that no protective antibodies are demonstrable in syphilis. Thus, and the lack of demonstrable antibodies by *in vitro* methods, reported earlier, render it improbable that immunity in syphilis is based on a humoral

Surgical Correction of Postvasectomy Sterility

JOHN W. DORSEY, M.D., F.A.C.S., F.I.C.S.

LONG BEACH, CALIFORNIA

IT is the purpose of this report to demonstrate that postvasectomy sterility can be corrected by surgical anastomosis of the vas deferens in a sufficiently high percentage of cases as to justify more frequent performance of this operation. O'Connor in 1948 stated that, of 750 urologists answering his questionnaire, 615 had never attempted surgical reunion of the vas deferens. Anastomosis of the vas deferens, or vasorrhaphy, is a reconstructive rather than a destructive surgical procedure, and as such proves most gratifying to the surgeon. This surgical procedure will often restore the unity and emotional stability of a marriage, and its natural by-product is the reproduction of the human race. Few operations have so much to offer both patient and surgeon.

Vasectomy for purposes of sterilization, although a relatively safe procedure when performed by a competent surgeon, is subject to both immediate and delayed physical, mental and social complications. Urologists should counsel their medical colleagues as to the serious social problems that may be created by the injudicious performance of vasectomy for sterilization, and emphasize further the need for extremely careful evaluation of the patient requesting vasectomy.

Wesson in 1950, in a masterly presentation, thoroughly discussed the legal status of vasectomy as a surgical procedure. His paper should be mandatory reading for all medical students and is recommended to all physicians who contemplate perform-

ing vasectomy, or who lightly advise their patients to undergo a sterilizing operation.

This report is based on a series of 20 cases of previously vasectomized male patients in whose cases surgical anastomosis of the vas deferens was considered feasible. The first operation was performed by myself in December 1946 and the most recent in August 1956. The average age of those requesting reunion of the vas deferens was 30.6 years; the oldest was 44 and the youngest 27. The average age at the time of vasectomy was 26.9 years, the oldest being 37. The youngest was 16 years old and single.

The average number of children in this group at the time of vasectomy was 1.3. The largest family consisted of 3 children, while in 5 instances there were none. The average number of years intervening between vasectomy and surgical reunion of the vas was eight and seven-tenths. The longest interval with a successful result was nineteen years. The shortest interval before correction of sterility was requested was two years.

A previous failure to restore continuity of the vas deferens does not preclude success on a second or even a third attempt to anastomose the vas deferens. In this series 6 patients were subjected to multiple procedures. In 4 a successful result was achieved on the second attempt to anastomose the vas deferens, and the fifth case is too recent to evaluate. In the sixth case three attempts were required to accomplish a successful result.

In this series of 20 cases there were 2 failures and 18 successful results. Success is predicated on the presence of active, viable sperm in the ejaculate, observed by

From the Department of Surgery, Division of Urology, University of California School of Medicine at Los Angeles. Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956. Submitted for publication Sept. 11, 1956.

physician and by myself. Testicular biopsy was not performed, on the assumption that in these previously fertile patients it would do more harm than good. This impression has been confirmed by Henri Bayle, who condemned testicular biopsy, being convinced that the slight hemorrhage contributes to subsequent fibrosis. It is the consensus that spermatogenesis is relatively unaffected by obliteration of the vas deferens. Bayle reported observing numerous mobile spermatozoa in 3 patients with congenital absence of the vas deferens, their respective ages being 41, 36 and 29 years. The successful results obtained in this series of cases are attributed to the method of splinting, careful approximation of the anastomotic site, minimal dissection and gentleness in the handling of tissues.

SUMMARY

Sterility following vasectomy was corrected successfully by anastomosis of the vas deferens in 90 per cent of the 20 cases reported in this series.

Any previous unsuccessful attempt at vasorrhaphy is not a contraindication to reoperation, as was evidenced by a successful result in 5 of 6 patients subjected to reoperation.

Testicular biopsy prior to vasorrhaphy was not performed in this series of cases.

Surgical occlusion of the vas does not appear to abolish spermatogenesis. Normal sperm were observed in 1 patient nineteen years after vasectomy.

Epididymovasorrhaphy should be attempted when anastomosis of the vas deferens is not technically feasible.

RIASSUNTO

Nel 90% dei 20 casi qui riportati la sterilità conseguente a vasectomia fu curata, con successo, anastomizzando il deferente.

Qualsiasi tentativo di vasoraffia fatto precedentemente senza un buon esito non controindica un nuovo intervento e ciò è reso evidente dagli ottimi risultati ottenuti in 5 o 6 pazienti sottoposti a reintervento.

In questa serie di casi non si fece mai la biopsia dei testicoli prima della vasoraffia.

L'occlusione chirurgica del vaso sembra che non abolisca la spermatogenesi. In un paziente si osservò, infatti, sperma normale a distanza di 19 anni dalla vasectomia.

Qualora non sia tecnicamente possibile l'anastomosi del deferente si può tentare l'epididimovasoraffia.

RESUMEN

La esterilidad consecutiva, a la sección de los conductos deferentes fué corregida con éxito por anastomosis de los conductos en 90 por ciento de los 20 casos reportados en esta serie.

Cualquier operación plástica que se haya intentado, previamente, sin éxito, no es contraindicación para reoperar, como pudo comprobarse por los resultados con éxito obtenidos, en 5 de 6 pacientes sometidos a reoperación. No se hizo biopsia testicular, previa a la anastomosis, en esta serie de casos.

La oclusión quirúrgica de los conductos no parece abolir la espermatogénesis. Se observó esperma normal en 1 paciente, diez y nueve años después de la sección de los conductos.

Plásticas con el epidídimo deben intentarse cuando la anastomosis del conducto no es posible técnicamente.

ZUSAMMENFASSUNG

Die nach Samenstrangextirpation aufgetretene Unfruchtbarkeit e 90 Prozent einer Reihe von 2

Neurologic Surgery

Operative Treatment of Cerebral Palsy Involving the Lower Extremities

CAROLL M. SILVER, M.D., AND STANLEY D. SIMON, M.D.*

PROVIDENCE, RHODE ISLAND

THIS presentation represents an eight-year study of cerebral palsy in children at the Meeting Street School in Providence, Rhode Island, from 1947 to 1955. The condition of each child in the Meeting Street School is evaluated, and his progress followed, by a pediatrician, a neurosurgeon, an orthopedic surgeon, a psychologist, a social worker, a physiotherapist, an occupational therapist and a speech therapist. Consultations by ophthalmologists, otorhinolaryngologists, and other specialists are readily available as the specific indication arises. Frequent group staff meetings are held for round-table discussion of the individual cases. In this integrated organization, orthopedic surgery is merely one facet in the comprehensive treatment of cerebral palsy in children. All patients are studied thoroughly for at least six months prior to the consideration of prospective surgical treatment.

In all, 250 children with cerebral palsy were treated at the Meeting Street School in the eight-year period between 1947 and 1955 (see table). Of these, 57 (23 per cent) were operated on, a total of 177 operative procedures being performed on

the lower extremities (see table). Thirty-four patients underwent bilateral operations; 23, unilateral operations.

As was pointed out by Phelps¹ in 1942, surgical therapy has considerable value provided definite spasticity of the involved

Analysis of Cases: Data on an Eight-Year Study of 250 Children with Cerebral Palsy, Meeting Street School, Providence, Rhode Island, with 177 Operations on 57 Patients (23 Per Cent)

Operation	Times Performed
Gastrocnemius recession, with section of motor nerves to gastrocnemius	73
Adductor myotomy with section of obturator nerve (4 crushings of obturator nerve)*	72
Soutter operation for flexion contracture (hips)	7
Lengthening of achilles tendon	6
Section of hamstring tendon for flexion contracture (knee)**	6
Stretching of calf muscle for equinus	5
Durham operation for internal rotation contracture (hip)	3
Yount fasciotomy (thigh)	1
Blount stapling of lower femoral epiphysis for unequal leg lengths	1
Transplant of achilles tendon slip to peroneus brevis; tenodesis for varus deformity	1
Gill posterior bone block (ankle)	1
Lambrinudi stabilization (foot)	1

*4 crushings of obturator nerve

**1 patient aged 11 years, 1 aged 10 years and 1 aged 4 years; 1 posterior capsulotomy of knee (Wilson)

*Consultants in orthopedic surgery, Meeting Street School, and attending orthopedic surgeons, Miriam Hospital, Providence.

Read at the Annual Meeting of the Academy of Cerebral Palsy, Memphis, Tenn., October 1955, as an Instructional Course.

Submitted for publication Dec. 18, 1956.

The inoculation of monkeys with pantropic and neurotropic yellow fever viruses

Experiment 1 An attempt was first made to determine whether inoculation of rhesus monkeys with pantropic and neurotropic yellow fever viruses actually did protect the monkeys

Fifteen monkeys were first injected with 1 c.c. of pantropic yellow fever virus either *subcutaneously* or *intraperitoneally*, contained either in the serum of rhesus monkeys dying of yellow fever or in the Berkefeld filtrate of a 20 per cent suspension of hedgehog liver at intervals varying from 10 minutes to 4 hours later the monkeys were again inoculated either subcutaneously or intraperitoneally with 2 c.c. of a 20 per cent suspension of mouse brain infected with neurotropic yellow fever virus. When the pantropic virus was given intraperitoneally the neurotropic virus was given subcutaneously and *vice versa*. Of these fifteen monkeys only two died, one of ordinary yellow fever 13 days after inoculation, a prolonged incubation period, the other of encephalitis 24 days after injection. Of the 7 control monkeys which received the pantropic virus only one recovered after a very severe attack of fever.

TABLE I

The result of injecting rhesus monkeys intraperitoneally with a mixture of pantropic and neurotropic yellow fever virus control monkeys received only pantropic virus

No of experiment	Pantropic virus c.c.	Neurotropic virus c.c.	Interval between injections	Test monkeys		Control monkeys	
				No	Result	No	Result
1	1 0*	2 0†	10 minutes	1	Survived fever	3	Died 6th day Y.F.
	1 0*	2 0†	"	2	" "	6	Died 7th day Y.F.
2	1 0†	2 0†	"	4	" "		
	1 0†	2 0†	"	5	" "		
3	1 0†	2 0†	"	7	Died 13th day Y.F.	9	Recovered fever, 4th 8th days
4	1 0†	2 0†	"	8	Survived fever		
	1 0†	2 0†	"	10	" no fever	13	Died 6th day Y.F.
	1 0†	2 0†	"	11	" fever		
	1 0†	2 0†	"	12	" fever		
5	1 0†	2 0†	1 hour	14	Died 24th day encephalitis	16	Died 10th day Y.F.
6	1 0†	2 0†	1 "	15	Survived fever		
	1 0†	2 0†	2 hours	17	" "	19	Died 8th day Y.F.
	1 0†	2 0†	2 "	18	" "		
7	1 0*	2 0†	4 "	20	" no fever	22	Died 5th day Y.F.
	1 0*	2 0†	4 "	21	" fever		
8	1 0†	2 0†	24 "	23	" "	25	Died 6th day Y.F.
	1 0†	2 0†	24 "	24	Died 7th day Y.F.		
9	1 0†	2 0†	24 "	26	Died 6th day Y.F.	28	Died 7th day Y.F.
	1 0†	2 0†	24 "	27	Died 5th day Y.F.		

* = Berkefeld filtrate of a 20 per cent suspension of infected hedgehog liver in normal serum saline

† = Serum from rhesus monkey dying of yellow fever

‡ = 20 per cent suspension in normal serum saline of mouse brain infected with neurotropic yellow fever virus

some overall improvement in the total functioning of the child, apparently related to achievement of some degree of physical independence.

The most frequently encountered deformities of the lower extremities are adduction of the hip, flexion of the knee and equinus of the ankle. This has been the experience of other observers.⁴ Less commonly observed have been flexion and internal rotation contractures of the hip, genu valgum and valgus and varus deformities of the foot.

It is essential to realize, as was emphasized by Phelps,⁵ that in any case of spastic paralysis three types of muscles may be observed: (1) spastic, (2) normal, (3) flaccid and paralyzed. A careful muscle survey should be made, since the interrelation of the muscle groups will determine whether operation is indicated and, if so, the operative procedure of choice. In some instances it is necessary to examine the child on several occasions to obtain an adequate analysis of the muscular functional relation. Failure of proper evaluation of the power of the antagonist muscle groups was primarily responsible for the poor results in certain cases of our series.

It is axiomatic that operation must be preceded and followed by adequate, intelligent physiotherapy and occupational therapy.⁶ The surgeon attempts to bring the antagonist muscle groups into gross equality and, as described by Crothers,⁷ the operations are usually devised to give balance by subtraction of power.

It has been our practice to make a motion picture of each child before and after operation, since we have noted that clinical impressions are often misleading in retrospect and that muscle charts alone do not yield an accurate picture of the dynamic walking pattern. We consider the motion picture records of great value in the study and evaluation of the operative procedures



Fig. 1. 2-year-old girl with of the left hip and at this early age, with mild dysplasia of acetabulum.

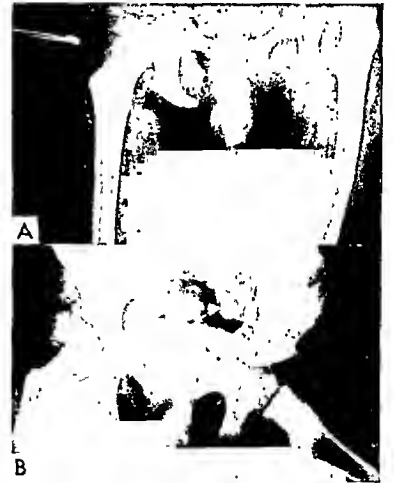


Fig. 2.—A, 2-year-old boy with severe spastic adduction contracture and complete dislocation of left hip. Discovered in routine pelvic roentgen studies of children with cerebral palsy. B, roentgenograms taken three months after operation (adductor release and section of anterior branch of obturator nerve). Wide abduction with long leg casts for six weeks, followed by abduction splint of Denis-Brown type. Note progressive reformation of acetabular roof and improved position of femoral head.

the Durham operation¹⁰ is a reliable procedure, dividing the anterior contracted fibers of the gluteus medius and minimus muscles. Great care must be taken to avoid overgenerous division of these important muscles; otherwise a disabling abductor hip sway will result.

The Knee—Flexion deformity of the knee may be due to overstimulation of the hamstring muscles and gastrocnemius and/or weakness of the quadriceps muscle, or it may be a compensating mechanism for a spastic equinus contracture of the hip. Obviously, the treatment must be directed to the primary cause.

In cases of flexion contracture of the knee hamstring tenotomies have given gratifying results, especially when combined with recession of the gastrocnemius muscle heads. The latter will be discussed in detail in the therapy of spastic equinus. Eggers¹¹ advocated transplanting the sectioned hamstring tendons into the posterior femoral condyles, as well as dividing the patellar retinaculum, in order to decrease knee flexion and improve hip extension. We have not had occasion to perform this operation, but the procedure appears preferable to simple hamstring tenotomy.

In knee flexion of long duration associated with spasticity, the ligamentum patellae and the quadriceps muscle are stretched. Chandler¹² advocated tightening and strengthening the quadriceps mechanism by lowering the tibial tubercle and the quadriceps insertion. This has provided considerable benefit in some cases. We had had previous personal experience with 2 instances of extension contracture of the knee following this procedure, however, and have not employed it since.

Posterior capsulotomy of the knee (Wilson) is indicated when the flexion contracture has involved the joint capsule proper. When the flexion deformity has become

irreversible from the standpoint of the soft tissues, supracondylar osteotomy of the femur is indicated.

The Ankle and Foot.—Spastic equinus was divided by Silfverskiöld¹³ into 2 significant groups: (a) equinus that is essentially inflexible with the knee fully extended but capable of being corrected passively with relative ease with the knee flexed to a right angle, and (b) persistent equinus, whether the knee is extended or flexed. With the first type he reasoned that the gastrocnemius muscle was the primary deforming factor, since when it was relaxed by flexing the knee the equinus contracture was overcome. Silfverskiöld advocated lowering, or recession, of the gastrocnemius muscle heads below the level of the knee joint, converting a two-joint muscle into a one-joint muscle. In effect, then, he converted the gastrocnemius into a second soleus muscle, which now had its origin below the knee joint. In addition, he advised partial section of the tibial motor nerves to the gastrocnemius muscle, to reduce its power further. The soleus muscle remained unaffected, and could be used for push-off from the forefoot in walking.

With the second type, in which the entire calf muscle mechanism (gastrocnemius and soleus) is contracted, lengthening of the achilles tendon is indicated. This should be done as an "open" procedure and is a potentially serious operation in cases of spastic equinus. Should a calcaneus gait result, the patient is more disabled than he was before the operation.

We have performed the Silfverskiöld operation (recession of the gastrocnemius muscle and section of the tibial motor nerves to the gastrocnemius) in 73 instances. We consider it the most reliable soft tissue operation for the spastic lower extremity, if the indications are properly met.

The operation is always performed

0.5 c.c. of neurotropic yellow fever virus and 0.5 c.c. pantropic tissue culture virus. Four of these persons had no reaction of any kind. The other twelve all had a febrile reaction 30 to 36 hours after inoculation, associated with headache and aching in the back. The reaction on the fourth to fifth days after injection was entirely absent.

In man also the evidence thus suggests that the neurotropic virus protects to a certain extent against the pantropic strain, but that the reverse does not hold. In view of the greater severity of the neurotropic reaction to that induced by the pantropic strain there seems no advantage, but rather increased danger from cerebral localisation in employing in man a mixture of neurotropic and pantropic viruses in preference to the pantropic virus alone.

The possible early development of immune bodies following inoculation of neurotropic yellow fever virus

Two possible explanations of the protective action of the neurotropic strain suggested themselves. The first was that the neurotropic virus very rapidly produced an immune response which was sufficient to counteract the pantropic virus. The second was that the particles of neurotropic virus blocked the cells for some days and thus prevented the pantropic virus from gaining an entrance.

Experiment 5 The following experiment was carried out to determine whether any formation of immune bodies could be detected either in the serum or in the regional lymph nodes of rhesus monkeys during the first four days after inoculation of neurotropic virus. The lymph nodes were selected because McMaster and Kidd (1936) have recently shown that after inoculation with vaccinia virus immune bodies may be detected in the regional lymph nodes some time before they appear in the blood serum.

Four rhesus monkeys were inoculated intradermally on the inner side of the left thigh with 0.2 c.c. of a 20 per cent suspension of mouse brain infected with neurotropic yellow fever virus. At intervals of one, two, three and four days the monkeys were killed, bled out and the serum separated off. The femoral lymph nodes were carefully dissected out, weighed and ground up in 1 in 10 serum saline to form a 10^{-1} dilution. At the same time as the inoculated monkeys were killed control monkeys of the same approximate age and weight were also killed and their sera and femoral lymph nodes removed.

The virus content of the serum and lymph nodes of the inoculated monkeys was first determined. Then a constant quantity of the serum and lymph node suspensions both from the inoculated and

wear until he is old enough for a bone stabilization procedure. It is essential that the power of the pedal dorsiflexors be evaluated properly. If these muscles are weak, foot drop and resultant equinus will recur despite release of the calf muscles, lengthening of the achilles tendon, or nerve section. In such cases the foot should be maintained at a right angle by a dropfoot brace until a satisfactory age for surgical treatment of bone has been reached. At that time a posterior bone block operation of the Gill or Campbell type may be carried out or, in the presence of a strong calf muscle, a foot stabilization operation of the Lambrinudi type.

The age of eight or nine years is considered the minimum age for surgical stabilization of bone. Since, as we have stated, we favor early operation on the soft tissues when definitive indications are present, it is understandable that few stabilization procedures are included in our series up to the time of writing.

Tendon transplantation to help overcome varus or valgus may be partially beneficial at the earlier ages. As was noted by Green and McDermott,² however, pedal arthrodesis, with or without tendon transplantation, offers by far the best results among operations performed on the foot.

SUMMARY

Follow-up studies are presented of children with cerebral palsy who have undergone operations for deformities of the lower extremities. A total of 177 operations on 57 patients is reviewed, and specific operative procedures are discussed.

An integrated team approach to the child with cerebral palsy is stressed. Surgical intervention is never considered until diagnostic studies are complete and sufficient follow-up data available to justify an attempt to arrive at a prognosis.

Given definite clinical spastic deformities of the lower extremities, operation should be performed at an early age, when developmental progress and abnormal neuromotor patterns appear fairly well defined. Three years seems the optimal age, and in the author's opinion the development of disabling secondary contractures of joint capsules and neurovascular structures is avoided when operation is performed at that time.

Orthopedic surgical treatment is merely one facet of the comprehensive treatment of cerebral palsy in children.

ZUSAMMENFASSUNG

Es wird über Nachuntersuchungen von Kindern mit Gehirnlähmung berichtet, an denen Operationen zur Behandlung von Entstellungen der unteren Extremitäten vorgenommen worden waren. Es liegt eine Nachprüfung von 177 an 57 Kindern vorgenommenen Operationen vor. Spezifische operative Eingriffe werden erörtert.

Es wird hervorgehoben, dass die Behandlung von Kindern mit zentraler Lähmung durch eine zusammengesetzte Gruppe von Spezialisten ausgeführt werden soll. Ein chirurgischer Eingriff sollte niemals in Erwägung gezogen werden, solange nicht alle diagnostischen Untersuchungen durchgeführt sind und genügend Nachuntersuchungen stattgefunden haben, um die Möglichkeit einer prognostischen Auswertung zu gestatten.

Wenn spastische Entstellungen der unteren Extremitäten mit Sicherheit festgestellt sind, sollte die Operation im frühen Alter ausgeführt werden, wenn Fortschritte in der Entwicklung und unnormale neuromotorische Symptomenkomplexe einigermassen klar erkannt werden können. Das beste Alter scheint das von drei Jahren zu sein, und die Verfasser glauben, dass, wenn die Operation um diese Zeit ausgeführt wird, die Entwicklung unaus-

have had some neutralising action on the greater dilutions of neurotropic virus

A study of tables V and VI shows that so far from having any

TABLE VI

An attempt to demonstrate immune bodies in the blood serum after intracutaneous inoculation of neurotropic yellow fever virus

Time after inoculation	Inoculated monkeys		Control monkeys
	Dilutions of serum	Undiluted serum and dilutions of virus	Undiluted serum and dilutions of virus
24 hours	Undil	†6, 6, 6, 7	
	10 ⁻¹	†6, 6, 6, 6	
	10 ⁻²	†6, 7, S, S	
	10 ⁻³	†7, 7, 8, S	
	10 ⁻⁴	†7, 8, 8, 8	†6, 6, 7, 7
	10 ⁻⁵	S, S, S, S	†6, 6, 7, 8
	10 ⁻⁶	S, S, S, S	†5, 6, 6, 7
	10 ⁻⁷	S, S, S, S	†6, 7, 8, 8
	10 ⁻⁸		†6, 7, 7, S
	10 ⁻⁹		†8, 9, S, S
	10 ⁻¹⁰		†7, 7, S, S
48 hours	Undil	†7, 8, 8, 9	†8, S, S, S
	10 ⁻¹	†9, 14, S, S	
	10 ⁻²	†9, S, S, S	
	10 ⁻³	S, S, S, S	
	10 ⁻⁴	S, S, S, S	†6, 7, 7, 8
	10 ⁻⁵	S, S, S, S	†7, 7, 8, S
	10 ⁻⁶	S, S, S, S	†8, 9, 9, S
	10 ⁻⁷	S, S, S, S	†7, 8, 8, S
	10 ⁻⁸	S, S, S, S	†7, S, S, S
	10 ⁻⁹	S, S, S, S	S, S, S, S
	10 ⁻¹⁰	S, S, S, S	S, S, S, S
72 hours	Undil	†5, 5, 7, 7	
	10 ⁻¹	†6, 7, S, S	
	10 ⁻²	†6, 6, S, S	
	10 ⁻³	†7, 7, S, S	
	10 ⁻⁴	†8, S, S, S	†5, 5, 6, 7
	10 ⁻⁵	S, S, S, S	†6, 6, 6, 6
	10 ⁻⁶	S, S, S, S	†6, 7, 7, 7
	10 ⁻⁷	S, S, S, S	†6, 6, 6, 7
	10 ⁻⁸	S, S, S, S	†6, 7, 7, S
	10 ⁻⁹	S, S, S, S	†6, 7, 7, S
	10 ⁻¹⁰	S, S, S, S	†6, 7, 8, S
96 hours	Undil	†6, 6, 6, 6	
	10 ⁻¹	†5, 6, 6, 7	
	10 ⁻²	†6, 7, 7, 7	
	10 ⁻³	†6, 7, S, S	
	10 ⁻⁴	†7, 9, S, S	†5, 5, 6, 6
	10 ⁻⁵	†6, 8, S, S	†5, 5, 6, 6
	10 ⁻⁶	S, S, S, S	†6, 6, 7, 7
	10 ⁻⁷	S, S, S, S	†5, 6, 6, 7
	10 ⁻⁸	S, S, S, S	†5, 6, 6, 8
	10 ⁻⁹	S, S, S, S	†6, 6, 8, S
	10 ⁻¹⁰	S, S, S, S	†6, 8, S, S

† = death the number indicates days from inoculation to death
S = survival

de la paralysie cérébrale chez l'enfant dans ces cas.

REFERENCES

1. Phelps, W. M.: Recent Trends in Cerebral Palsy, *Arch. Phys. Therapy* 23:232, 1942.
2. Green, W. T., and McDermott, L. J.: Operative Treatment of Cerebral Palsy of Spastic Type, *J.A.M.A.* 118:434, 1942.
3. Mathews, S. S.; Jones, M. H., and Sperling, S. C.: Hip Derangements Seen in Cerebral Palsied Children, *Proc. Ann. Meet. Am. Acad. Cerebral Palsy*, Durham, North Carolina, October 1952.
4. Barnett, H. E.: Orthopedic Surgery in Cerebral Palsy, *J.A.M.A.* 150:1396, 1952. Green and McDermott.²
5. Phelps, W. M.: The Treatment of the Cerebral Palsied Child, *Clinics* 2:981, 1943.
6. Carroll, R. E., and Craig, F. S.: Surgery in Cerebral Palsy, *S. Clin. North America* 31:385, 1951.
7. Crothers, B.: Clinical Aspects of Cerebral Palsy, *Quart. Rev. Pediat.* 6:142-148, 1951.
8. Stoffel, A.: The Treatment of Spastic Contractures, *Am. J. Orthoped. Surg.* 10:611, 1912.
9. Soutter, R.: A New Operation for Hip Contractures in Poliomyelitis, *Boston M. & S. J.* 170:380, 1914.
10. Durham, H. A.: A Procedure for the Correction of Internal Rotation of the Thigh in Spastic Paralysis, *J. Bone & Joint Surg.* 20:339, 1938.
11. Eggers, G. W. N.: Transplantation of Hamstring Tendons to Femoral Condyles in Order to Improve Hip Extension and to Decrease Knee Flexion in Cerebral Spastic Paralysis, *J. Bone & Joint Surg.* 34-A:827, 1952.
12. Chandler, F.: Re-establishment of Normal Leverage of Patella in Knee Flexion Deformity in Spastic Paralysis, *Surg., Gynec. & Obst.* 57:523, 1933.
13. Silfverskiöld, N.: Orthopedische Studie über Hemiplegia Spastica Infantilis, *Acta Chir. Scand., Suppl. V*, Stockholm, 1924. Reduction of the Uncrossed Two-Joints Muscles of the Leg to One-Joint Muscles in Spastic Conditions, *ibid.* 56:315, 1924.

Do not ask a man if a man has been through college; ask if a college has been through him.

—Chapin

No mortal has a right to wag his tongue, much less to wag his pen, without saying something.

—Carlyle

It makes a great difference in the force of a sentence whether a man be behind it or not.

—Emerson

Such as thy words are, such will thy affections be esteemed; and such will thy deeds be as thy affections; and such thy life as thy deeds.

—Socrates

Experiment 6 In order to test whether Rift Valley fever virus was capable of protecting monkeys against the pantropic strain of yellow fever virus, eleven monkeys were inoculated with 0.5 c.c. of a 20 per cent suspension in saline of mouse liver infected with the pantropic strain of Rift Valley fever virus. Two hours later they were given 0.5 c.c. of serum from a monkey dying of yellow fever. Five control monkeys received the pantropic yellow fever virus only. Of these control monkeys none survived but of the eleven test monkeys, seven recovered after a short febrile reaction (table VII, p. 413).

There thus appeared to be a possibility that Rift Valley fever virus could exercise some protection against yellow fever virus in monkeys.

The result of inoculating mice with a mixture of neurotropic yellow fever virus and pantropic Rift Valley fever virus

As there was evidence that Rift Valley fever virus gave some degree of protection to monkeys against pantropic yellow fever virus, it seemed of interest to determine whether yellow fever virus would protect against Rift Valley fever virus in mice. The pantropic strain of Rift Valley fever virus is highly pathogenic for mice (Findlay and Daubney, 1931, Findlay, 1931-32) and after intraperitoneal or subcutaneous inoculation death in a very high percentage of animals occurs in from 48 to 72 hours after injection.

Experiment 7 Mice were therefore inoculated intraperitoneally with 0.25 c.c. of a 20 per cent suspension of mouse brain infected with neurotropic yellow fever virus either *before* or *after* intraperitoneal injection of 0.2 c.c. of a 10^{-3} suspension of mouse liver infected with pantropic Rift Valley fever virus.

TABLE VIII

Survival of mice inoculated with 0.25 c.c. of a 20 per cent suspension of mouse brain infected with neurotropic yellow fever virus preceded by 0.2 c.c. of a 10^{-3} suspension of mouse liver infected with Rift Valley fever virus control mice inoculated with Rift Valley fever virus only

No of experi ment	Interval between injections	Experimental mice					Control mice						
		No of mice inoculated	No of survivors days after inoculation					No of mice inoculated	No of survivors, days after inoculation				
			2	3	4	5	5+		2	3	4	5	5+
1	4 hours	30	23	12	7	6	4	30	7	4	3	2	2
2	6 „	30	20	9	5	3	2	30	2	1	0		
3	24 „	30	2	0				30	0				

in 39 per cent. Cephalic presentations occurred in 87 per cent, breech presentations in 6.8 per cent, and transverse presentations in 4.8 per cent. Twins were delivered in 1.4 per cent.

The standard treatment at Baylor Hospital for central placenta praevia or placenta praevia that covers more than a marginal portion of the os is cesarean section. The amount of cervical dilatation must be taken into consideration, and section is the treatment if the patient has an unripe cervix or cervical dilatation of less than 5 cm. Twenty-nine patients, or 20 per cent, were delivered vaginally in this series. Artificial rupture of the fetal membranes and, in a few cases, pitocin were used to induce or hasten labor in the cases of several patients delivered by the vaginal route. It is important to remember in managing placenta praevia that rupture of the fetal membranes in the face of a transverse presentation, or posterior implantation of the placenta as described by Stallworthy,⁹ can be dangerous. In the first instance additional manipulation is required, resulting in increased risk to the mother and the fetus. In the second instance, disproportion from the placenta riding over the sacral promontory occurs, displacing the presenting part anteriorly.

Cesarean section was performed in 108 cases, or 80 per cent. Fifteen were classic cesarean sections; 1 was extraperitoneal, and the remainder were of the low flap or the low cervical type. The technic of cesarean section is left to the operating surgeon, but the staff policy of the hospital is to avoid the placenta if at all possible, using a technic similar to that described by Butler¹⁰ and Neligan.¹¹ By this technic one avoids making an incision directly through the placenta and, if possible, sweeping it to one side, and rupturing the membrane at the lateral placental margin. It is important to use an adequate incision, so that this manipulation may be carried

out without too much difficulty. The amount of blood lost may be to some extent determined by the amount of time consumed from incision of the uterus to the clamping of the cord. One must remember that the fetus will lose considerably more blood if the incision is made through the placenta than if one avoids or goes around the placenta. In our series there was 1 case of recurrent placenta praevia after cesarean section. This substantiates, to some extent, Bender's premise¹² that manipulation of the lower uterine segment by conization, trachelorrhaphy and low cervical cesarean section predisposes to placenta praevia.

Delivery of the placenta, either vaginally or abdominally, is frequently accompanied by profuse and prolonged hemorrhage. The placenta is attached to the noncontractile lower uterine segment, and there is a diminution in the amount of decidua, with insufficient thromboplastin for local thrombosis. Rupture and tearing of the large dilated veins of the lower uterine segment frequently occurs. There may be some degree of placenta accreta, and forcible detachment of this leads to profuse bleeding. In some cases it is necessary to perform a rapid hysterectomy or, on occasion, to suture the bleeding vessels at the site of placental implantation prior to closing the uterus.

The management of vasa praevia or placenta praevia of a succenturiate lobe is much the same as the management of placenta praevia. In most cases, diagnosis is not made until after delivery has been accomplished by cesarean section.

Anesthesia in most cases was given by qualified physician anesthesiologists. Gas anesthesia was used in 84, or 61 per cent, of the 137 deliveries. This figure includes the 29 vaginal deliveries. In the remaining 52 cases, or 39 per cent, spinal anesthesia was employed. There has been a progressive increase over the past five years in the

infected with neurotropic yellow fever virus, but heated to 60° C for half an hour, failed to protect against pantropic yellow fever virus for three monkeys receiving 1 0 c c of a 20 per cent suspension of normal mouse brain intraperitoneally 20 minutes before subcutaneous inoculation with 0 5 c c of serum from a monkey dying of ordinary yellow fever, all died in from 4 to 6 days Similarly

TABLE X

Survival of mice inoculated intraperitoneally with 0 25 c c of a 20 per cent suspension of normal mouse brain followed by 0 2 c c of a 10⁻³ suspension of mouse liver infected with Rift Valley fever virus control mice inoculated with Rift Valley fever only

No of experi ment	Interval between injections	Experimental mice					Control mice						
		No of mice inoculated	No of survivors, days after inoculation					No of mice inoculated	No of survivors, days after inoculation				
			2	3	4	5	5+		2	3	4	5	5+
1	$\frac{1}{2}$ hour	12	6	0				12	1	0			
2	2 hours	12	11	2	1	0		12	9	0			
Total		24	17	2	1	0	0	24	10	0	0	0	0

TABLE XI

The effect of inoculating mice with Rift Valley fever virus followed after 4 hours by neurotropic yellow fever virus heated for 30 minutes at 60° C

No of experiment	Amount of inoculum in c c of heated neurotropic yellow fever virus	Experimental mice					Control mice						
		No of mice inoculated.	No of survivors, days after inoculation					No of mice inoculated	No of survivors, days after inoculation				
			2	3	4	5	5+		2	3	4	5	5+
1	0 2	30	2	0				30	3	0			
2	0 5	12	0					12	1	0			

three monkeys given 1 0 c c of a 20 per cent suspension of mouse brain infected with neurotropic yellow fever virus heated to 60° C for half an hour, also died with yellow fever 5, 5 and 6 days after inoculation

Experiment 9 Finally, in view of the local protective action of india ink against vaccinia, described by Ledingham, a series of 20 mice were given intraperitoneal injections of 0 2 c c of a 20 per cent suspension of india ink in normal saline, 48 hours, 24 hours and 10 minutes before an intraperitoneal inoculation of

AB-Titer ist von grosser Wichtigkeit. Weiterhin spielen die umfangreichere Anwendung des Kaiserschnitts, der Abschluss operativer Eingriffe durch die Scheide, Belehrung der Patientin hinsichtlich der Gefahren von Blutungen in der Schwangerschaft und eine sorgfältigere Ausbildung der geburtshilflich tätigen Ärzte eine grosse Rolle. Die fötale Sterblichkeit wurde durch abwartende Haltung in der Behandlung von Frauen, die weniger als 32 Wochen schwanger waren, herabgesetzt. Ebenso wichtig ist der Beitrag des Kinderarztes, der feststellt, dass ein Teil der bei Placenta praevia auftretenden Blutung vom Fötus stammt und in vielen Fällen zur Entbindung eines ausgebluteten Neugeborenen führt.

RIASSUNTO E CONCLUSIONI

Viene descritta la cura della placenta previa al Baylor Univ. Hospital in un periodo di 5 anni. Si ebbe il 13% della mortalità fetale e nulla fu la mortalità materna. Questo basso indice di mortalità viene attribuito a diversi fattori. La pronta disponibilità di sangue incluso O Rh negativo e un basso titolo AB sono di grande importanza, come pure lo sono un più corrente uso del taglio cesareo, una più evoluta educazione delle paziente riguardo ai pericoli dell'emorragia in gravidanza e una più intensa preparazione e istruzione dei medici ostetrici. La mortalità fetale è stata abbassata col trattamento di attesa nelle donne che erano gravide da meno di 32 settimane.

Ugualmente importante si è dimostrato, da parte dei pediatri, il pronto riconoscimento che parte dell'emorragia associata alla placenta previa è di natura fetale e che in molti casi dà luogo ad un feto esangue.

RESUMEN Y CONCLUSIONES

Se describe el manejo de la placenta previa en el Baylor University Hospital

en un período de más de cinco años.

Hubo un índice de mortalidad fetal de 13 por ciento y un índice de mortalidad materna de 0. Estos bajos índices de mortalidad se atribuyen a varios factores. La pronta disponibilidad de sangre, incluyendo disponibilidad inmediata, de O-Rh negativo, sangre AB, es de gran importancia. El uso creciente de cesáreas, supresión de procedimientos operatorios vaginales, mejor educación de las pacientes respecto al peligro de hemorragias durante el embarazo e instrucción y entrenamiento intensivos de los médicos encargados de obstetricia son factores importantes. La mortalidad fetal se ha disminuido por el manejo de expectativa en pacientes con menos de treinta y dos semanas de embarazo. De igual importancia es el pronto reconocimiento del pediatra de que parte de la hemorragia asociada con placenta previa es del lado fetal y, en muchos casos, resulta un niño exangüe.

RÉSUMÉ ET CONCLUSIONS

L'auteur décrit le traitement du placenta praevia au Baylor University Hospital durant les cinq dernières années.

Le taux de mortalité foetale a été de 13%, celui de la mère de 0%. Une grande importance est attribuée aux facteurs suivants: disponibilité immédiate de sang, y compris le O Rh négatif, et sang titrant un faible AB; recours plus fréquent à la césarienne, abandon des techniques d'opérations vaginales, meilleure éducation des malades quant aux dangers des hémorragies durant la grossesse; enfin, formation et entraînement plus poussés des obstétriciens. Le taux de mortalité foetale a été abaissé grâce à la méthode expectante dans les cas où la grossesse était antérieure à 32 semaines. Il est important aussi pour le pédiatre de savoir qu'une partie de l'hémorragie provient du fœtus, et que celui-ci se saigne à blanc dans bien des cas.

these experiments was only very slightly pathogenic for mice when inoculated either intraperitoneally or even intracerebrally

DISCUSSION

The experiments here described serve to confirm the findings of Hoskins that the injection of neurotropic yellow fever virus protects rhesus monkeys, in a high percentage of cases, against a virulent injection of pantropic yellow fever virus provided (1) the inoculations are given subcutaneously or intraperitoneally, (2) the injection of neurotropic yellow fever virus follows the injection of pantropic virus at an interval of less than 24 hours

When the mixture of the two strains of virus is given intracerebrally in rhesus monkeys the abdominal viscera are still protected by the neurotropic against the pantropic strain, but the mixture does not protect the central nervous system against the neurotropic virus and the mice thus die from encephalitis

Similar results were obtained in hedgehogs after subcutaneous inoculation of neurotropic and pantropic yellow fever viruses, for in these animals death follows from encephalitis, while the abdominal viscera are protected. From experiments also in mice and in men the conclusion is drawn that the pantropic yellow fever virus exerts no protective action against the neurotropic yellow fever virus

The explanation of the phenomenon is obscure. On the one hand no evidence was obtained of the early development of immune bodies as a result of injection of neurotropic yellow fever virus, nor is there any evidence of any cross-immunity, either *in vivo*, or *in vitro*, between yellow fever and Rift Valley fever

On the other hand, the phenomenon does not appear to be due to a purely mechanical blockade of certain susceptible cells for neither normal mouse brain, mouse brain containing killed yellow fever virus, nor india ink possessed the high efficiency of living neurotropic yellow fever virus in protecting mice against Rift Valley fever virus

At this point it is necessary to examine a possibly analogous phenomenon that has been recorded in association with a number of plant viruses

In 1931 Thung, having isolated a yellow tobacco mosaic virus in Java, found that when approximately equal parts of juice containing the yellow mosaic virus and equal parts of the common tobacco mosaic virus were mixed, and the mixtures used to inoculate healthy tobacco plants, the symptoms of both diseases appeared in the inoculated plants. From certain spots in the leaves the infective principle of each disease was separately recoverable

If a light yellow spot was cut out of a leaf and used for the inoculation of healthy plants the yellow mosaic was always recovered. If tissue from a darker green area was used the ordinary green mosaic was isolated. Thung

Ophthalmologic Surgery

Enucleation with Integrated Orbital Implant

N. A. KARAKASHIAN, M.D., F.A.C.S., F.I.C.S.

PHILADELPHIA, PENNSYLVANIA

THIS report relates five years' experience in evaluating a new integrated orbital implant in 24 patients. Its development, of course, owes much to the pioneering effort of Ruedeman, Cutler, Hughes and others. This implant (Figure 1) is made up of vitallium, a casting alloy consisting of chromium, cobalt and molybdenum, that rarely causes tissue reaction and is widely used in orthopedic and dental work. Because of its relative inertness, the alloy seemed to offer promise of overcoming the problems encountered with various plastics, metals and combinations of these materials. The size of the implant is important, since implants 14 mm. or larger not only are too heavy, but offer reduced motility. This implant is 13 mm. in both height and width. Its design, evolved through trial and error, and with the assistance of Austenal Laboratories, is simple in construction. In the hollow sphere there are numerous large openings, which serve two purposes: first, they facilitate suturing the implant to the tissue; second, they permit loose orbital tissue to pass through the openings and grow into the implant in such a way as greatly to reduce the likelihood of extrusion. To promote better adhesion of tissue to metal, the surface of the implant is left unfinished.

Ordinary silk, cotton and catgut sutures

were found unsatisfactory, since they often disintegrate before the implant is firmly attached to the surrounding tissue. With the assistance of Davis & Geck's research department, nylon was found satisfactory, since nylon sutures usually remain intact for twelve to eighteen months. The technic is simple and seldom requires more than thirty minutes. After separation of the conjunctiva and tenon's capsule from the anterior eyeball, the individual rectus muscles are located, dissected and held with sutures or hemostats. After removal of the eye, gelfoam is placed and held under pressure in the cavity. Next, the implant, on which four nylon

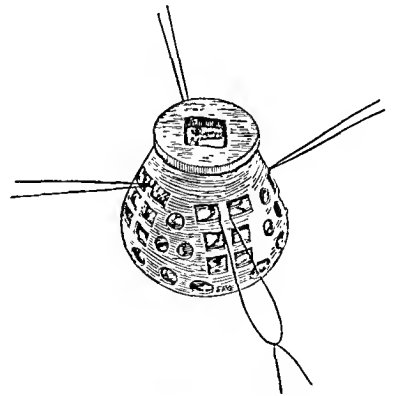


Fig. 1.—Karakashian vitallium implant.

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.
Submitted for publication Sept. 23, 1956.

(2) Those species of monkeys that react to yellow fever by a febrile reaction also show a febrile response to Rift Valley fever, while those species (chiefly African) that exhibit an afebrile infection with yellow fever, also show no signs of infection with Rift Valley fever virus (Findlay, 1932-33)

(3) Both yellow fever and Rift Valley fever produce necrosis of the liver with acidophilic intranuclear inclusions and Councilman lesions

(4) Neurotropic strains can be obtained from both viruses and in both cases the encephalomyelitis is characterised by the presence of intranuclear inclusions (Mackenzie, Findlay and Stern, 1936)

(5) Both yellow fever and Rift Valley fever give rise to a lasting immunity in man

(6) Evidence has been brought forward by Daubney and Hudson (1933) to show that Rift Valley fever like yellow fever is transmitted by *Aedes* mosquitoes

It is thus not impossible that the two diseases may have sprung from some common ancestral form

In this connection the geographical distribution of the two diseases in Africa is of considerable interest

Yellow fever, which is predominantly a disease of the West Coast of Africa, has now been shown to extend as far east as the Anglo-Egyptian Sudan and the western part of Uganda. It has never reached Kenya and the East Coast (*cf* Sawyer and Whitman, 1935-36). Rift Valley fever on the other hand is present in Kenya, Uganda, the Anglo-Egyptian Sudan, French Sudan and French Equatorial Africa, but has not yet been found in Nigeria, the Gold Coast, Sierra Leone or Gambia (*cf* Findlay, Stefanopoulou and MacCallum, 1936). An explanation of the varying geographical distributions of these two diseases has not yet been found.

In plant viruses the phenomenon of interference is only seen in connection with those viruses that are generically related, in animals it is also best seen in relation to generically related viruses such as the neurotropic strains of yellow fever, but it may also be met with in connection with viruses where the generic relationship is not clear.

If yellow fever virus and Rift Valley fever virus were plant and not animal pathogens there would, almost certainly, be correlated with the interference phenomenon here described, a similarity in the serological reactions of the two viruses. At present no definite explanation can be given as to the mechanism by which one virus interferes with the pathogenic action of another virus either in animals or plants. There is, however, in certain respects a close similarity to the phenomenon of chemotherapeutic interference wherein the treatment of trypanosomes on feebly or inactive chemical compounds prevents the action of highly active compounds. Chemotherapeutic interference is now usually regarded (*cf* Oesterlin, 1936) not as a biological, but as a purely physico-chemical phenomenon.

The fact that neurotropic viruses will protect certain organs

with other integrated implants, a large former with a peg is used postoperatively to prevent adhesions in the conjunctival sac. The conformer must be the best one that the conjunctival sac will fit, in order to prevent shrinkage of that area and to preserve deep fornices during the first three weeks of healing. This step, though it appears trivial, is of utmost importance, since it may decide whether the operative procedure will result in good motility. The larger area between the lateral sulci and between the upper and the lower sulci, the greater the area through which the prosthesis will move. Moreover, it enables the eye maker to use a larger prosthesis. Immediate postoperative care is as usual, except that Prednisolone is used, 5 g. four times a day is given by mouth for three days and thereafter reduced to once a day for another week. Two or three weeks after the operation the patient is usually ready for the eye maker. Even though the first prosthesis the results have been excellent, with respect to both motility and comfort. Naturally, this part of the procedure should not be left entirely to the eye maker. The patient should return with the first prosthesis and be tested for motility with the fixation light, the eye maker to center the pupils and the light reflex.

The first patient in a series of 24 was operated on in March 1951. There have been no extrusions. All patients are under surveillance and are checked four times a year. In general, irritations, secretions and other sequelae subside eight weeks after the operation. Owing to the inert qualities of the metal, the implant is easily tolerated. In the first two months following the operation the patient is instructed to remove the prosthesis twice a week and irrigate the socket with sterile saline solution after carefully washing his hands and face. Handling of the

prosthesis with clean hands is always stressed, since failure to do so is considered one of the reasons for undue irritation and infection. After eight weeks the prosthesis is removed only once a week for irrigation of the socket. The medication used to prevent secondary infection is 30 per cent sodium sulfacetamide, of which 2 minims are administered three times a day for the first two months; then 2 drops twice a day thereafter, as necessary.

SUMMARY

This article describes a light vitallium integrated orbital implant which is easily tolerated, simple to use and allows greater adjustment by the eye maker, with a history of no extrusions thus far.

The implant offers the following advantages:

1. Operating time is reduced to an average of thirty minutes in uncomplicated cases.
2. There have been no extrusions up to the time of writing (first case seventy months ago).
3. Motility is excellent.
4. Tissue reaction is minimum and secretions nil after eight weeks.
5. The normal fold of the upper lid is better retained.
6. The lower lid does not carry the weight of the implant as with nonintegrated implants.

The single disadvantage is the fact that the implant is more costly than are plastic implants.

CONCLUSIONES

El autor esta convencido de que se ha logrado un progreso definitivo con el uso de injertos integrales. El uso de vitallio, con el diseño y técnica aquí descritos han sido base del progreso así obtenido.

fever viruses gives rise to reactions similar to those induced by the neurotropic virus, while those induced by the pantropic virus are absent

7 The evidence therefore goes to show that the neurotropic protects against the pantropic yellow fever virus, but the pantropic virus does not protect against the neurotropic virus

8 The interference of the neurotropic with the pathogenic action of the pantropic virus in the rhesus monkey is not due to any precocious development of immune bodies either in the lymph nodes or serum

9 The subcutaneous or intraperitoneal inoculation of mixtures of pantropic yellow fever virus and pantropic Rift Valley fever virus in rhesus monkeys resulted in the protection of seven out of eleven animals

10 The intraperitoneal inoculation of mice with mixtures of neurotropic yellow fever virus and pantropic Rift Valley fever virus caused a delay in the death of the mice and in a small percentage of cases completely protected the mice

11 This protective action was not seen if Rift Valley fever virus was given 24 hours before the inoculation of the yellow fever virus

12 No protective action against Rift Valley fever in mice was manifested by intraperitoneal inoculations of normal mouse brain, mouse brain containing killed neurotropic yellow fever virus or india ink

13 A scarcely perceptible protection against Rift Valley fever in mice was given by intraperitoneal inoculation of a strain of fowl pest virus non-pathogenic for mice

14 A possible explanation of the interference shown by the neurotropic strain of yellow fever virus with the pathogenic action of the pantropic strains of yellow fever and Rift Valley fever is that when certain cells are already occupied by actively multiplying virus particles they cannot be invaded by certain other virus particles

15 Attention is drawn to a very similar phenomenon in plant viruses here, however, to produce interference the feebly pathogenic virus *must* be generically related to the highly pathogenic virus

16 Evidence is discussed in regard to whether there exists a generic relationship between yellow fever and Rift Valley fever which is not apparent by the ordinary tests applied to animal viruses

Since the above was written Bruce White (this *Journal*, 1937, xlv 276) has again drawn attention to the fact that feebly lytic phages protect *Vibrio cholerae* against strongly lytic phages and gives as an explanation that the less lytic phage, lacking nothing in combining vigour, establishes itself on the "phage receptors" of the bacterium, forbidding entry to its more destructive confrère

gain entrance by penetrating the floor of the space. Proximally, the interdigital subcutaneous spaces communicate with the most superficial layer of the central plantar space along the tunnels for the digital nerves. Distally each space communicates beneath the superficial transverse plantar ligament with the corresponding web space. A collar-stud abscess, with one abscess cavity lying within the calloused skin and the other occupying an interdigital space, is present occasionally.

Infection of one of these spaces is most common amongst coolies and others who work barefooted, especially in urban areas. Often the patient states that a sharp stone, a nail or a thorn has penetrated the sole. At other times the cause is infection via the lymphatics from an infected crack in the calloused skin overlying the space. Rao and Kini reported that in 19 of 23 cases the infecting organism was *Staphylococcus aureus*.

Diagnosis: The patient complains of increasing pain between the shafts of the two metacarpals that bound the infected space. Soon he is unable to walk, and the general reaction is moderately severe. Exquisite tenderness over the infected space proclaims the diagnosis. When the pus has decompressed itself into the dorsal subcutaneous space, localization is more difficult.

Treatment: Drainage must be placed away from the weight-bearing area of the

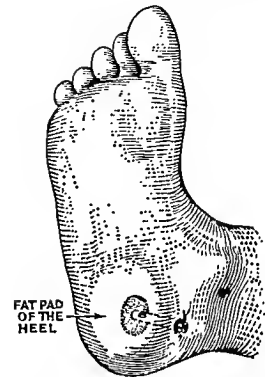


Fig. 2.—Drainage of an abscess of the heel space. The incision is placed above the calloused skin covering the heel.

sole. The best incision is that used for drainage of a web space (see Fig. 3). A hemostat is directed into the cavity filled with pus, and its jaws are opened. Tube drainage is required. In the case of a collar-stud abscess, both pockets must be drained separately through the same cutaneous incision. When pus has burrowed posteriorly through the apex of the space, an incision or a counterincision is made in the line of the digital nerve in the pliable non-weight-bearing skin of the fore part of the instep. When an extension into the dorsal subcutaneous space has occurred, a counterincision is required in the line of

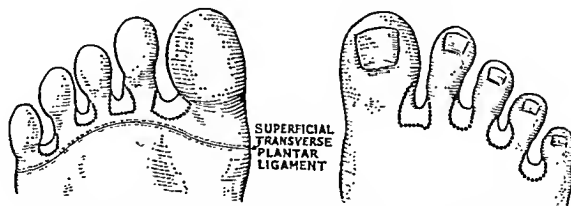


Fig. 3.—The web spaces, showing the extent on the plantar and dorsal aspects of the foot.

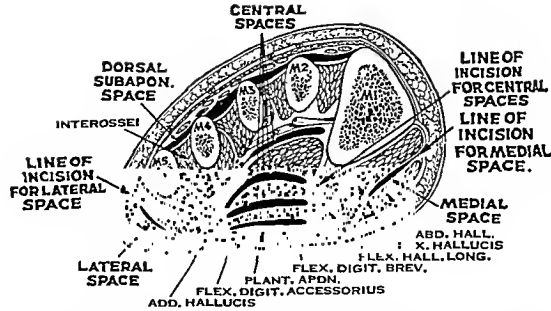


Fig. 6.—Transverse section through the middle of the metatarsals, showing fascial spaces. The lines for opening the lateral, medial and central spaces are shown. Note especially that each of the four compartments of the central space can be opened by the same incision if the fascial septum is incised (after Grodinsky).

The diminutive lumbrical tendon passes through the proximal part of the space and, as in the hand, it can serve as a conductor of pus, in this instance to bring the web space into communication with the corresponding interdigital subcutaneous space.

Diagnosis: There is localized tenderness over the dorsal and the plantar aspect of the web.

Treatment: Drainage is effected by making an incision through the plantar aspect of the space, care being taken not to injure the superficial transverse plantar ligament. When necessary, a counterincision is made on the dorsum and through-and-through drainage thereby effected. A piece of corrugated rubber is always left in place for at least twenty-four hours.

Infection of the Deep Fascial Spaces of the Sole.—There are three deep fascial spaces in the sole—a medial, a central and a lateral space. The medial and the lateral space are of subsidiary importance, for they are comparatively rarely infected.

The central plantar space is arranged like an apartment house of four stories.

On the first (ground) floor is plantar space I, which lies between the plantar fascia and the flexor digitorum brevis. On the second floor lies central plantar space II, which is situated between the flexor digitorum brevis and the flexor digitorum accessorius. On the third floor is central plantar space III, floored by the digitorum accessorius and roofed by the adductor hallucis. On the fourth floor is central plantar space IV, which is floored by the adductor hallucis and roofed by the metatarsal bones, their ligaments and the interosseus muscles.

Infection of the various floors of the central plantar space (Fig. 4) becomes increasingly less common as one proceeds from the ground floor upward. The usual cause of infection of the central plantar

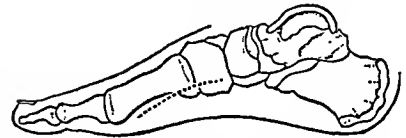


Fig. 7.—Incision for draining the lateral plantar space.

- | | | |
|--|---------|--|
| SAWYER, W A , AND WHITMAN, L | 1935 36 | <i>Trans Roy Soc Trop Med and Hyg</i> , xxi 397 |
| SELLARDS, A W | 1931 | <i>Proc Nat Acad Sci</i> , vii 330 |
| STOKES, A , BAUER, J H , AND HUDSON, N P | 1928 | <i>Amer J Trop Med</i> , viii 103 |
| THEILER, M | 1930 | <i>Ann Trop Med Parasit</i> , xxiv 249 |
| THUNG, T H | 1931 | Handeling 6 Ned -Indisch Natuur wetensch Congr 22 26 Sept Bandoeng (Java), p 450 |

After-Treatment: Rest on a back splint, with the leg raised on pillows or, preferably, swung in a Bloxham's cradle, is maintained for two or three days, or until the pulse and temperature are normal. The patient should then be taken to the operating theatre and the wound or wounds packed lightly with petroleum gauze. A plaster cast is then applied. After the patient has been returned to bed, the limb is again elevated. Fixation in plaster is most important; otherwise contractures are liable to occur, resulting in a considerable deformity of the foot that is most difficult, or even impossible, to correct. After ten days or a fortnight, unless there is some indication for doing so before, the plaster cast is removed and renewed. The patient can be ambulatory during this period, but the cast should be retained until the wound has healed. After removal of the plaster edematous swelling is prone to occur and is most disabling; for, although it is not usually associated with much pain, the increased size of the foot makes it impossible to wear an ordinary shoe. Swelling can be prevented by the application of an Unna paste bandage to the foot and leg immediately after removal of the cast. The bandage must extend from the base of the toes to the tuberosity of the tibia, and it should be kept on for six weeks or longer if the tendency to swell is persistent. When the bandage becomes dirty, it is changed. In due course an orthopedic shoe will be required in most cases.

Drainage of the Lateral Plantar Space: To evacuate pus from the lateral space the incision shown in Fig. 7 is employed. The incision passes through the skin and subcutaneous tissue, and the space is opened widely by incising the deep fascia. Corrugated rubber drainage is provided.

Drainage of the Medial Plantar Space: The incision is almost the same as that advised for the central plantar space (see

Fig. 5), but it should be made a little more toward the plantar aspect of the foot and over the site of maximum tenderness. To summarize, it should be the rule always to evacuate pus from the plantar aspect of the foot through an incision over either the medial or the lateral border of the foot. Such incisions not only provide adequate drainage but insure that the subsequent scar is well away from the weight-bearing area.

Infections of the Dorsum of the Foot.—

The dorsal subcutaneous space is usually infected by an extension of infection from a subcutaneous interdigital space or a web space. Occasionally localization of infection occurs in the space, when infection spreads from the sole to the dorsum by way of the lymphatics; such localization is always distal to the dorsal venous arch. The incision should be placed in the line of the vessels or nerves, in order to avoid them.

The dorsal subaponeurotic space can be infected from direct puncture; it can also be involved from an extension of infection from plantar space IV. When infection of this space is suspected, aspiration should be attempted and the diagnosis confirmed before the incision is made. A longitudinal incision is then made alongside the needle. The cavity is drained with corrugate rubber for twenty-four hours.

SUMMARY

The author lists as infections of the foot the following conditions: infected blister; paronychia; infected adventitious bursa associated with a corn; infected bursa over a hallux valgus; terminal pulp space infection; suppurative tenosynovitis; infection of the interdigital subcutaneous spaces, the heel space, the web spaces, the deep fascial spaces of the sole, the central, medial and lateral plantar spaces, the dorsal subcutaneous space and the

Wright, the Panton and Valentine (P V) leucocidin by the method described by Valentine (1936), and the α haemolysin by titration of the minimum haemolytic dose using rabbit red blood corpuscles, the end-point being taken as the highest dilution of the filtrate to show complete haemolysis of an equal volume of 2 per cent rabbit red blood cells. All determinations have been made at 100 per cent differences, as this appears to be the limit of accuracy of the N W estimations. The N W results have been expressed as the highest dilution of toxin which completely prevents the reduction of 0.1 c.c. of 1 in 5000 methylene blue by two minimal reducing doses of leucocyte suspension. The P V results have been expressed quantitatively by means of an arbitrary unit, L, which has been suggested by Valentine, it is the strength of toxin which is neutralised by an equal volume of a 1 in 100 dilution of serum, K (see Parish, O'Meara and Clark, 1934), but is still active when mixed with an equal volume of a 1 in 200 dilution.

EXPERIMENTAL

Six strains of staphylococci have been examined which were capable of producing high P V leucocidin and little haemolysin, the results obtained were probably typical of this group of staphylococci. Filtrates (1-6) were prepared from these strains by the method of Parish and Clark which is known to produce high α haemolysin content with suitable strains, and filtrates (7-12) prepared by the Valentine (1936) method which favours the production of P V leucocidin. Six other strains were studied from which filtrates (13-18) containing varying amounts of α haemolysin and negligible P V leucocidin were obtained by the former method. In view of Wright's work, it was not considered necessary to increase the number in this group. Toxin, B 8750 (Parish, O'Meara and Clark), and two filtrates (19, 20) exceptionally high in P V leucocidin were also studied. The results are summarised in table I, the values being the mean of at least three determinations. The variation between different estimations on the same toxic filtrate was never greater than 100 per cent, which is probably near the limit of accuracy of the N W method.

With regard to filtrates (1-6, 13-18 and B 8750) prepared by the method of Parish and Clark, the α haemolysin and N W values agreed within the experimental error of the test, this is in accord with Wright's findings. The P V leucocidin values of these filtrates were negligible.

With filtrates (7-12) prepared by the Valentine method, the α haemolysin was low, and both the N W and P V values were high and in close relationship to each other. When, however, filtrates (1-6) were prepared from these strains by the method of

After-Treatment: Rest on a back splint, with the leg raised on pillows or, preferably, swung in a Bloxham's cradle, is maintained for two or three days, or until the pulse and temperature are normal. The patient should then be taken to the operating theatre and the wound or wounds packed lightly with petroleum gauze. A plaster cast is then applied. After the patient has been returned to bed, the limb is again elevated. Fixation in plaster is most important; otherwise contractures are liable to occur, resulting in a considerable deformity of the foot that is most difficult, or even impossible, to correct. After ten days or a fortnight, unless there is some indication for doing so before, the plaster cast is removed and renewed. The patient can be ambulatory during this period, but the cast should be retained until the wound has healed. After removal of the plaster edematous swelling is prone to occur and is most disabling; for, although it is not usually associated with much pain, the increased size of the foot makes it impossible to wear an ordinary shoe. Swelling can be prevented by the application of an Unna paste bandage to the foot and leg immediately after removal of the cast. The bandage must extend from the base of the toes to the tuberosity of the tibia, and it should be kept on for six weeks or longer if the tendency to swell is persistent. When the bandage becomes dirty, it is changed. In due course an orthopedic shoe will be required in most cases.

Drainage of the Lateral Plantar Space:

To evacuate pus from the lateral space the incision shown in Fig. 7 is employed. The incision passes through the skin and subcutaneous tissue, and the space is opened widely by incising the deep fascia. Corrugated rubber drainage is provided.

Drainage of the Medial Plantar Space:

The incision is almost the same as that advised for the central plantar space (see

Fig. 5), but it should be made a little more toward the plantar aspect of the foot and over the site of maximum tenderness. To summarize, it should be the rule always to evacuate pus from the plantar aspect of the foot through an incision over either the medial or the lateral border of the foot. Such incisions not only provide adequate drainage but insure that the subsequent scar is well away from the weight-bearing area.

Infections of the Dorsum of the Foot.—

The dorsal subcutaneous space is usually infected by an extension of infection from a subcutaneous interdigital space or a web space. Occasionally localization of infection occurs in the space, when infection spreads from the sole to the dorsum by way of the lymphatics; such localization is always distal to the dorsal venous arch. The incision should be placed in the line of the vessels or nerves, in order to avoid them.

The dorsal subaponeurotic space can be infected from direct puncture; it can also be involved from an extension of infection from plantar space IV. When infection of this space is suspected, aspiration should be attempted and the diagnosis confirmed before the incision is made. A longitudinal incision is then made alongside the needle. The cavity is drained with corrugated rubber for twenty-four hours.

SUMMARY

The author lists as infections of the foot the following conditions: infected blister; paronychia; infected adventitious bursa associated with a corn; infected bursa over a hallus valgus; terminal pulp space infection; suppurative tenosynovitis; infection of the interdigital subcutaneous spaces, the heel space, the web spaces, the deep fascial spaces of the sole, the central, medial and lateral plantar spaces, the dorsal subcutaneous space and the dorsal

qualification that the effect of a hæmolysin does not appear to be quite so marked, it was often difficult with dry films to distinguish between normal rabbit neutrophils and those killed by a hæmolysin

TABLE II

Microscopical appearance of rabbit polymorphonuclear leucocytes from different dilutions of a N W estimation, using toxins 20 and B 8750

Toxin	Toxin dilution	Reduction of methylene blue	Dry films stained by Leshman	Wet film
20 (Panton Valentino type)	1 12 5	—	Cells and nucleus completely disrupted	Cells and nucleus completely disrupted
	1 25	—	"	Cells spherical in appearance, granules of disrupted nucleus arranged round periphery
	1 50	—	"	"
	1 100	—	A few "recognisable polymorphs	A few "recognisable polymorphs
	1 200	—	"	"
	1 400	+	Some recognisable polymorphs Cells mainly intact	Cells mainly intact, a few swollen
	1 800	+	Cells intact	Cells intact
	1 1000	+	"	"
B 8750 (a hæmolysin) type)	1 25	—	Outline of cell intact, nucleus showing signs of degeneration	Cells mainly intact with slight disruption of nucleus
	1 50	—		
	1 100	+	Cells intact "	Cells intact "
	1 200	+	"	"

— = methylene blue unreduced

+ = methylene blue reduced

Toxins 20 and B 8750 both have high N W values. Toxin 20, which contains little a hæmolysin and a very high P V leucocidin, shows the characteristic breaking up of the rabbit neutrophil due to P V leucocidin, and it is quite easy to predict the end-point of the titration from the appearance of the films. With toxin B 8750 the neutrophils have a different appearance, the cells remaining comparatively intact, the nucleus only showing signs of degeneration. Under these conditions it is difficult to estimate the end-point of the titration microscopically. It is interesting that with toxin 20 a very few intact red corpuscles were seen in films from all dilutions, but with toxin B 8750 only in films of dilutions 1 in 100 and 1 in 200. This is additional evidence that, with toxin B 8750, the N W value is dependent on the a hæmolysin content, but, with toxin 20, independent of it.

An Orthopedist Looks at Collagenous Tissue Diseases

HARVEY E. BILLIG JR., M.D., F.I.C.S.

LOS ANGELES, CALIFORNIA

PHYSICAL reactions in the morning are highly relevant to fibrous tissue, for at that time one tends to be a little "stiffer" than on the night before. Over night there is a tendency to "tighten up" with the relative inactivity of the body. The morning impulse to "loosen" results in a stretch, a yawn and, in the more ambitious, setting-up exercises. The limber cat finds itself arising and stretching periodically, even though it may then resume its nap.

Early in the study of anatomy and histology one is struck by the remarkable prevalence of collagenous tissue in the body, together with its extensive fibrous tissue sheathings surrounding the cells, groups of cells, tendons and organs, and ramifying as fascial planes and ligaments. The intricate relation of nerves, blood vessels and lymphatics wending their way through and by these fascial planes is a wonder to behold.

Time was when these collagenous tissue structures, together with bone, cartilage and teeth, were regarded as inert substance laid down within the body and not subject to the laws of living biologic substances. It is now known that these are truly living structures, constantly functioning in accordance with biochemical and physiologic principles; therefore, a better understanding of their function is possible. The knowledge that there is a constant

living physiologic chemical exchange and replacement of the elements that make up these tissues enables one to apply genetic principles, laws of mechanical force, the effects of metabolic endocrine modulation, nutritional factors (vitamins, amino acids, minerals, etc.)¹ and Bernard's pharmacological together with Langley's autonomic balancing² to these, as well as the other tissues of the body.

In the presence of certain androgenic endocrine deficiencies the vertebrae demineralize as senile osteoporosis³ with an increasing dorsal round back and pathologic compression fractures due to the weakened bony structure of the bodies. In the presence of hyperparathyroidism the generalized demineralization, with scattered localized fibrocystic areas, demonstrates a profound physiologic change of the bone physiology under an altered metabolic influence. In the same way, the collagenous fibrous tissues that make up tendons, ligaments, fascia and other connective tissues are to be regarded as living dynamic tissues.

Hisaw⁴ in 1926 published an article concerning the relaxation of the pubic ligaments of the guinea pig, showing the effect of endocrine balance on fibrous tissue and pointing the way toward understanding of the cyclic nature of shortening and lengthening of fibrous tissue with the estrus cycle and the loosening of joints at parturition to allow the pelvis to spread, thus increasing the size of the birth canal. The theoretical substance "relaxin," elaborated as a result of metabolic balance,

From the Billig Clinic, Los Angeles.
Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 8-13, 1956.
Submitted for publication Sept. 16, 1956.

joint ligaments have been torn or avulsed from their bony attachments. When joints have been traumatized by forcing the range of motion past the ligamentous restriction, as may occur when the facet joints of the spine are affected by the jerk of falling or diving, or by a rear-end motor collision, they must be restored to their proper position and held there until the joint ligaments have had a chance to "tie down" in healing and once more perform their proper function of limiting the range of motion short of subluxation or dislocation. Otherwise, periodic subluxations will occur and can be recognized as, for example, "kinks in the neck," often taking days to weeks to "wear off." Subluxation is a mechanical malalignment that throws intense strain on the surrounding fascial and ligamentous planes, causing them to constrict the pathways of motor, proprioceptive and autonomic nerves and resulting in peripheral involuntary muscle contraction (spasm or fasciculation), pain, tingling, numbness and vasomotor phenomena. In the neck this frequently results in autonomic cervical sympathetic stimulation, producing pains in the head and distortion of vision.^{2a} An avulsion fracture is a good illustration of the pulling out of a piece of bone at the attachment of the ligaments or tendons when the joint is forced into subluxation *past its limit of motion*. The subluxation must be corrected and the avulsed bone immediately replaced and held there, else recurrent subluxations will result. A common example of this is "baseball finger."

In persistent repeated manipulation⁷ of a joint to restore the gliding motion and achieve an increased range of motion, there is a progressive accumulative fibrous stretching that loosens the capsule to its normal laxity. Past this point the manipulation should not be carried, else subluxation may occur. Manipulation of a joint under anesthesia to achieve remobilization

at "one fell swoop" is to be condemned, as it causes drastic tearing damage to the periarticular structures, with hemorrhage, and, in healing, the production of that much more constricting contracture of fibrous tissue. The history of medicine contains the record of a disastrous era when such approaches to joint mobilization were employed.

Study of the elasticity of fibrous tissue and of the various factors affecting its production, shortening and lengthening are the keys to the control of many common afflictions. Studies of wound healing show that in healing by first or "primary" intention a fibrous formation takes place from fibrin and the surrounding cells, bridging the gap throughout the depth of the lesion, and that this fibrous tissue then *contracts* to bind the wound edges into approximation and hold them there. Healing of a wound by "secondary intention," in which the edges of the wound cannot be brought together at the outset, must take place progressively from inside out, so that the shortening contraction of the fibrous tissue formation will close the wound progressively, proceeding from the depth outward to the surface. It is well recognized that the surface must be kept open to allow this to happen, without production of a "dead space"; else necrotic material, hematoma (*filling the "dead space"*), or infection will be enclosed and the wound break down secondarily or a heavy, thick scar result. Gentle, repeated kneading distention massage of a scar will progressively stretch and loosen the fibrous tissue and soften the scar. Here again is an example of the ever-present balance between the tightening and loosening of fibrous tissue.

The tendency associated with certain types of arthritis, toward excessive production of fibrous tissue that tightens about the joints and produces disabling contractures is well recognized. In the

neck organs, which were then removed as a whole. To prevent drying the glands were placed in a moist chamber between two Petri dishes, the lower one lined with saline soaked filter paper, the glands being kept from the saline by two dry microscope slides. As soon as possible after removal each of the glands was weighed separately to the nearest milligram. In children and infants they were often weighed together but if the nature of any of the tissue was doubtful they were weighed separately, frequently to the nearest fifth of a milligram. The glands were measured and their colour and position described. They were then fixed in 4 per cent saline formaldehyde and embedded in paraffin, sections were cut in the longest axis and as nearly as possible through the thickest part of the glands. It was the rule to embed together all the glands found but in such a way that they would be identified according to the positions they occupied in the body. After histological confirmation the weight of the total amount of parathyroid tissue removed was obtained.

In view of the considerable variation in the amount of interstitial tissue, due to adiposity chiefly, it was considered necessary to calculate the weight of the parenchyma or secreting gland tissue. To do this it was first necessary to estimate the percentage volume of parenchyma. By means of a simple projection apparatus an outline was made of the whole gland in the section, and all the interstitial tissue, including any ectopic thymus or thyroid, was also outlined in the same drawing (fig 1). Drawings of all the glands in a case were made at the same magnification upon a single sheet of paper, the size of the drawings varying from 2 to 8 inches in length according to the complexity of the structure. The areas were calculated by means of a planimeter. It was thought best to estimate the area occupied by interstitial tissue rather than parenchyma as the former was usually less. A mark (fig 1, A) was made for convenience on the circumference of the left hand upper drawing at some point where the interstitial tissue lay at or reached the surface. Then all the areas of interstitial tissue were joined up by lines passing from gland to gland, so that an open chain of areas joined by lines was formed, upon which any number of side chains could be added. It is essential never to join any two side chains, for then the area contained within the lines will be estimated as well as the sum of the areas that the lines connect. In complex drawings it was found advisable to shade areas of parenchyma (as fig 1, B) which lay in a larger area of interstitial tissue, one such shading reveals the nature of all the other outlined areas in the drawing. Such an island of parenchyma was joined by a line to the parenchyma near by. If there was some defect in the section it was outlined and hatched (fig 1, C), and a line was drawn from it to the surface. In using the planimeter the tracer point started at A, at which the reading on the measuring wheel was noted or set at 0. It was then moved carefully along the circumference in a clockwise direction, passing from gland to gland and returning along the other side of the glands from that traversed in the outward journey. In this way the movement caused by passing backwards and forwards along the connecting lines cancelled out, and that caused by circumscribing the glands was alone recorded on the wheel. On coming upon a defect in a section an excursion was made to it. Its area was circumscribed anticlockwise and thus deducted from the total. The areas of interstitial tissue were treated in the same way. On coming upon islands of parenchyma (as fig 1, B) they were circumscribed anticlockwise and their area was thus deducted from the total interstitial tissue. As only percentage volume of parenchyma was required it was unnecessary to estimate the exact size of the areas in the section. The carriage, therefore, of the instrument was not set at any particular point on the tracer arm, and for the same reason it was unnecessary to know the magnification caused by the

the sensory (external and internal) system feeds into the brain the stimuli, which are then transmitted to the hypothalamus; this, in turn, exercises a control over the pituitary, which, in its own turn, elaborates the specific glandular trophins (thyrotrophin, adrenal cortical trophin, gonadotrophin, etc.), which circulate via the blood stream to the particular glands and stimulate their endocrine production. These endocrines then circulate to all the tissues of the body, exercising their particular share of control of the enzymatic chemical reactions of metabolism.

Colchicine,¹⁴ for many years a standard remedy for gouty arthritis and often taken as wine of colchium, has recently taken on an extensive and exciting new significance. Enzymatic chemical research on fibrous tissue has made wide use not only of fibroblast cultures but of the spindle fibers formed in the metaphase of mitotic cell division. The effect of colchicine^{14b} in inhibiting the fibrous contractile mechanism of the spindle is startling. When this effect is present, the synergistic effect of the steroid hormones is pronounced, although they themselves do not have this power. Other substances that produce this colchicine-like effect are now known, although they are not nearly so effective, and it is postulated that the body normally elaborates, or at least utilizes, substances to provide this colchicinoid mediative effect. It has been shown that adenosine-triphosphoric acid (ATP^{14b}) is probably indispensable to fibrous contraction of the spindle fiber, and that the colchicine acts on the cell by modifying this mechanism.¹⁵ The role of steroid activity in this direction has been extensively studied by Katzberg of the University of Oklahoma Medical School.

The use of colchicine to enhance the mediative effect in steroid therapy for the correction of fibrous contractures in cases of collagenous tissue disease has wide ap-

plication, and, in many instances, the patient can be "trailed off" steroid therapy to the maintenance dose of colchicine (daily divided doses in amounts just short of producing gastrointestinal symptoms) without fear of recurrence of contracture, so long as this maintenance dose is continued. Return of aching in joints and "stiffness" observed within a couple of months after the maintenance dose is interrupted are frequent. At the Billig Clinic there are constantly returning patients, not seen for several years, who had decided, against advice, that they were "well" and the maintenance dose of colchicine was no longer necessary and then had noticed, within two months after discontinuing it, a recurrence of symptoms. Such patients rarely need a second "lesion." Certain of the synthetic steroids seem to cause pronounced further depression of the patient's own production of adrenal cortical steroids so that, upon discontinuance of the synthetic steroids (because of other side effects; Cushing's, etc.), there are recurrent symptoms more severe than the original ones. The administration of ACTH and testosterone to these patients, as a means of stimulating recovery of the adrenal cortex, is indicated but is not always especially successful. These patients tend to present a fixed aggravation-intolerance psychic attitude that does not clear up.

As has been pointed out, the fundamental tendency of fibrous tissue is to contract, shorten and form contractures reducing the range of motion unless this tendency is opposed. The cat remains agile from frequent stretching. Volkman's ischemic contracture, contraction of the gastrocnemius and soleus muscles, "shortening" of the achilles tendon and the scalenus anticus syndrome are examples of pronounced shortening of muscles due to fibrocytic contracture of the fibrous elements of the muscle to include muscle

was very adipose. In sets of the first type there was obviously no appreciable difference between the relative amounts of parenchyma and interstitial tissue in different sections, in sets of the second type there was less uniformity, while in the third type, the very adipose glands, the amount of adipose tissue showed considerable variation in different sections, and the possibility of error was obviously at its greatest. In order, therefore, to test the accuracy of the method, the mean percentage of the parenchyma in serial sections of each of the glands in a set of average glands and in a set of very adipose glands was compared with the percentage found in the central section. The results are set out in table I. In the set of four glands of average structure the differences between the percentage in the central section and the mean are -0.6 , -1.4 , $+4.3$, $+2.7$. These differences are obviously slight. In the set of very adipose glands the differences are $+6.3$, $+6.4$, $+12.3$, $+4.6$. In these glands, which can be accepted as likely to give the greatest error, the differences are not great, except in the third gland.

TABLE I

Comparison of percentage area of parenchyma in serial sections and in central section

	Gland 1	Gland 2	Gland 3	Gland 4
<i>Glands of average structure, P M 419/35</i>				
Number of observations, sections 36 micra apart	22	22	22	22
Mean	71.6 ± 1.40	68.4 ± 0.97	65.7 ± 7.72	72.3 ± 0.68
Standard deviation	6.57	4.54	12.76	3.20
Coefficient of variation	0.18	0.06	10.43	4.42
Mean of first 5 sections	79.8	74.2	80.2	75.2
Mean of last 5 sections	65.0	66.6	46.0	68.4
Parenchyma in middle of gland	71	67	70	75
Difference between mean percentage and percentage in central section	0.6	1.4	4.3	2.7
<i>Very adipose glands, P M 310/36</i>				
Number of observations, sections 30 micra apart	28	28	38	36
Mean	65.7 ± 2.03	60.6 ± 2.14	54.7 ± 1.45	39.4 ± 0.93
Standard deviation	10.75	11.32	8.94	5.56
Coefficient of variation	16.37	16.26	16.36	14.10
Mean of first 5 sections	47.6	51.8	62.4	40.4
Mean of last 5 sections	68.2	79.6	40.4	29.0
Parenchyma in middle of gland	72	76	67	44
Difference between mean percentage and percentage in central section	6.3	6.4	12.3	4.6

From the percentage volume of parenchyma thus obtained the actual weight of the parenchyma was calculated, and in order to reduce error a modification was introduced to make allowance for the amount of fat in the interstitial tissue. As there was no more satisfactory method of estimating the fat it was judged by the eye under the microscope, as many cases as possible being examined at one sitting. The result was expressed as percentage of fat in the interstitial tissue to the nearest 5 per cent when the amount of fat was very great or very sparse, and otherwise to the nearest 10 per cent. The specific gravity of fat was taken to be 0.9, being the

fications by means of specific repetitive active and passive stretchings will free the involved nerve pathways from their constrictive irritation and bring relief from the troublesome signs and symptoms.

SUMMARY

The anatomic, physiologic and biochemical aspects of collagenous tissue are reviewed in terms of the modern concept of "living tissue."

The "living tissue" response of collagenous tissue to the various common metabolic (endocrine), mechanical and disease states are outlined and correlated with the concomitant changes in bone, muscle and cartilage changes accompanying the various phases of the male and female life span from "insemination" to "dissemination."

Metabolic, mechanical and nutritional aids in insuring the success of orthopedic operative procedures by control of the collagenous tissue responses are offered.

ZUSAMMENFASSUNG

Es wird über die anatomischen, physiologischen und biochemischen Eigenschaften kollagenen Gewebes im Sinne der modernen Auffassung von "lebendem Gewebe" berichtet.

Die Reaktion kollagenen Gewebes als "lebendes Gewebe" auf die verschiedenen gewöhnlichen Zustände des Stoffwechsels (innersekretorischer Art), mechanische Bedingungen und Krankheitszustände werden umrissen und zu den gleichzeitig vorhandenen Veränderungen im Knochen, Muskel und Knorpel in Beziehung gebracht, die die verschiedenen Stadien des Lebens des Mannes und der Frau kennzeichnen.

Es werden Hilfsmittel metabolischer, mechanischer und alimentärer Art in Vorschlag gebracht, die durch Regulierung

der kollagenen Reaktionen zur Sicherung der Erfolge orthopädischer operativer Eingriffe beitragen sollen.

RÉSUMÉ

Les aspects anatomiques, physiologiques et biochimiques du tissu collagène sont passés en revue en fonction du concept moderne du "tissu vivant."

La réaction du "tissu vivant" du collagène aux différents états métaboliques, endocriniens, mécaniques et pathologiques est décrite et mise en corrélation avec les modifications concomitantes de l'os, du muscle et du cartilage, accompagnant les différentes phases de la vie mâle et femelle s'étendant de l'"insémination" à la "dissemination."

L'auteur propose des auxiliaires métaboliques, mécaniques et alimentaires en vue d'assurer le succès de procédés opératoires orthopédiques par le contrôle des réactions collagéniques.

RIASSUNTO

Rassegna degli aspetti anatomici, fisiologici e biologici del collagene secondo il moderno concetto di "tessuto vivente."

Viene descritta la risposta di questo tessuto ai vari stimoli metabolici (endocrini), meccanici e morbosi, e i rapporti con le contemporanee modificazioni delle ossa, dei muscoli e della cartilagine.

Vengono suggeriti gli ausili metabolici, meccanici e nutritivi che possono contribuire al successo degli interventi ortopedici, attraverso il controllo dell'attività del collagene.

RESUMEN

Se revisan los aspectos anatómico, fisiológico y bioquímico del tejido colágeno de acuerdo con el concepto moderno de "tejido vivo."

TABLE II
Endocrine abnormalities Males

(1) Four or more glands, 53 cases		(2) Three glands, 12 cases	
a	<i>Thyroid</i>	g	<i>Thyroid and suprarenal bodies</i>
	Atrophy		Colloid goitre, cortical suprarenal adenoma
	Slightly colloid, diffuse goitre, Graves' disease		Colloid adenomata, cortical adenomata
	Diffuse, moderately colloid goitre, with one colloid adenoma		Unspecified thyroid adenoma, cortical adenoma
	Colloid goitre	h	<i>Thyroid and testicles</i>
	Colloid adenoma or adenomata		Colloid adenoma, atrophy of testicles
	Colloid adenoma and atrophy		Colloid adenoma, fibrosis of testicles
	Cystic colloid adenoma and adenomata	i	<i>Pancreas and suprarenal bodies</i>
	Colloid cysts		Carcinoma of pancreas, cortical suprarenal adenoma
	Colloid adenoma and parenchymatous adenoma		
	Parenchymatous adenoma	k	<i>Suprarenal bodies and testicles</i>
	Partly colloid, partly parenchymatous adenoma and adenomata		Cortical suprarenal adenoma, atrophy of testicles
	Unspecified adenoma and adenomata		
b	<i>Pancreas</i>	a	<i>Thyroid</i>
	Diabetes		Atrophy
	Carcinoma		Slightly colloid, diffuse goitre, Graves' disease
			Colloid goitre
			Colloid adenoma
			Colloid cysts
c	<i>Suprarenal bodies</i>	b	<i>Pancreas</i>
	Tuberculosis, Addison's disease		Calculeous atrophy
	Destructive atrophy, Addison's disease	c	<i>Suprarenal bodies</i>
	Cortical adenoma		Tuberculosis, Addison's disease
	Focal cortical atrophy		Cortical adenoma
	Focal cortical atrophy and secondary carcinoma		Extensive or bilateral secondary carcinoma
	Hæmorrhage	d	<i>Thymus</i>
d	<i>Pituitary gland</i>		Thymic carcinoma, myasthenia gravis
	Carcinoma	o	<i>Thyroid and pancreas</i>
			Colloid cyst in thyroid diabetes
e	<i>Testicles</i>		
	Atrophy		
f	<i>Thyroid and pancreas</i>		
	Colloid cyst in thyroid diabetes		

Fracture-Dislocation of the Talus with Posterior Displacement of the Body and Avascular Necrosis

I. W. DAVIDSON, B.A., M.D., F.R.C.S. (Can., Edin.), F.I.C.S.

AND

W. J. McCracken, M.D., F.R.C.S. (Can.)

SUDBURY, ONTARIO, CANADA

SOME 17 cases of fracture-dislocation of the talus, a rather infrequent injury, have been reviewed in the hope that some new light might be shed on the management of this most serious type of injury and complication. It must be emphasized that this article is a preliminary report, presenting the authors' ideas concerning treatment in an attempt to improve the results. Several cases will be presented in which these ideas have been carried out to justify their presentation at this time.

Anatomic Background: Ankle Mortise.

—The talus is intra-articular. Three-fifths of the surface is covered with articular cartilage, and the structure takes part in the formation of three joints: the ankle, the subtaloid joint and the mid-tarsal joints (talonavicular). The talus is a hinge joint, and only in extreme of dorsiflexion does it fully occupy the ankle mortise.

In normal weight bearing relatively no force is transmitted from the heel or forefoot through the center of the talus to the center of the ankle joint. Practically all of the force is taken up by the gripping action of the external fibular and medial tibial malleoli through the sides of the talar body by means of complex ligaments of the ankle joint.

Mode of Production of Injury (Anderson).

son). — The accompanying illustration shows the third degree of a dorsiflexion injury which begins as follows:

1. The neck of the talus is impacted against the anterior edge of the lower end of the tibia, producing a vertical fracture of the neck of the talus.

2. Force is further transmitted from the neck of the talus to ligaments of the posterior part of the subtaloid joint, causing subluxation of the foot forward on the body of the talus and a posterior subtaloid dislocation.

3. The foot continues in dorsiflexion and supination. The displacement continues, and the medial surface of the tuberosity of the calcaneus comes to lie under the body of the talus. While in this position the sustentaculum tali of the calcaneus locks in front of the medial tubercle of the body of the talus. Rarely, pronation causes lateral and posterior displacement of the body.

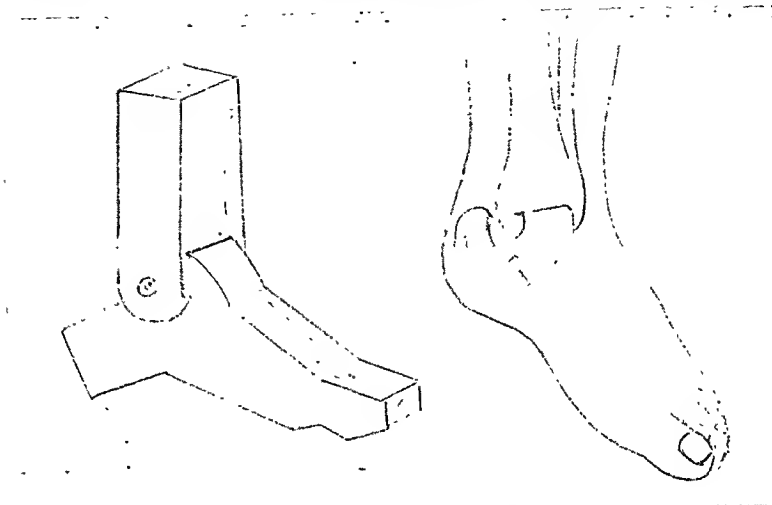
When violence ceases and the foot is in plantar flexion, the locked body of the talus is displaced backward out of the tibiofibular mortise. It lies on the medial surface of the tubercle of the calcaneus, with the fractured surface directed laterally, the trigonal tubercle medially and the medial tubercle hooked behind the sustentaculum tali.

Avascular Necrosis.—It is interesting to note that, in this series, avascular necrosis was absent in all cases of fracture he

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.
Submitted for publication Sept. 21, 1956.

TABLE IV
Bone diseases

<i>Males</i>		<i>Females</i>	
(1) Four or more glands, 13 cases		(1) Four or more glands, 11 cases	
a Bone		a Bone	
Secondary carcinoma	2	Barlow's disease	1
Osteoarthropathy (carcinoma of lung)	1	Focal osteitis fibrosa	1
Osteomyelitis	2	Osteomyelitis	2
Hodgkin's lymphogranuloma	1	Secondary carcinoma	1
Spongy thickening (2 cm) of parietal bones, no histological abnormality	1	Plates of bone in dura	1
Thickening of cortex of right femur, lateral bowing of left, kyphosis, no histological abnormality except slight porosis	1		
Enchondroma (2.9 x 1.5 cm) in right femur	1	b Bone and endocrine glands	
Osteophytes on inner table of skull	1	Osteomalacia and osteoporosis (coeliac disease), cryptocephalic ovarian cyst	1
Plate of bone in falx cerebri	1	Dyschondroplasia, thyroid adenomata, suprarenal cortical adenoma	1
		Secondary carcinoma, unilocular serous ovarian cyst	1
b Bone and endocrine gland		Osteophytes beneath partially healed traumatic defect in skull, colloid cyst in thyroid	1
Secondary carcinoma, atrophy of thyroid gland	2		
		a Bone	
(2) Three glands, 5 cases		(2) Three glands, 1 case	
a Bone			
Osteomalacia and osteoporosis (coeliac disease)	1		
Secondary carcinoma	2		
Myelomatosis	1		
Callus of lamellar bone in right femur, invasion of skull by meningioma	1		
(3) Two glands, 1 case			
a Bone and endocrine gland			
Ricketts, hypoplasia of left testis	1		



Third degree of dorsiflexion injury (see text).

There was 1 "good case" (P.D. rating, 12 per cent) and 1 "poor case" (P.D. rating 25 per cent). Open reduction was required in all; avascular necrosis was present in all. In 3 cases the heads are still completely dead, with fusion. In the remainder revascularization is taking place, beginning from 12 to 24 months after the injury. It is our opinion that early fusion does not accelerate the rate of revascularization. In 3 "fair cases," in which pain persists, subtaloid arthrodesis may be required. The patients in 5 cases in which no ankle fusion was performed have good ankle joints.

In the second group of cases (Table 2) there was more severe injury, with comminution of the talus or loss of skin and infection (osteomyelitis). Excision of the talus was necessary in 4 cases.

In 4 cases, 1 fusion (tibial calcaneal) appears satisfactory. In 2 cases fusion will

be required. In 1 case the status is not assessable.

These two groups of cases illustrate most of the complicating problems mentioned with reference to management of these cases. The end results, on the whole, are not good—in fact, extremely disappointing. How, then, is one to approach this serious problem to minimize or prevent complications?

Reduction is urgently necessary, immediately the fracture is seen, to prevent embarrassment of cutaneous circulation, infection and osteomyelitis.

Reduction must be accurate. Try closed reduction by manipulation *once*; do not aggravate the injury further by prolonged manipulation. Be prepared, if one attempt fails, to carry out an open reduction immediately. Do not prolong the injury by attempts at skeletal traction. Use a posteromedial incision; unlock nes

The results of the statistical examination of the material are set out in tables VI to XVI. The terms parathyroid and parenchyma are used in the tables to mean respectively weights of the glands and of their calculated content of parenchyma.

*Comparison of the different groups with four or more glands
(table VII)*

The "normal" group Among the adults (21 years and over) of this group the mean and standard deviation for parathyroid are 117.6 ± 4.0 mg and 45.97 respectively in males and 131.3 ± 5.8 and 45.02 in females. The corresponding figures for parenchyma are 82.0 ± 2.6 mg and 29.99 in males and 88.9 ± 3.9 mg and 30.07 in females. If the mean plus thrice the standard deviation is accepted tentatively as the upper limit of the normal for the purpose of examination of the individual cases in the five groups, then in males 255.5 mg is obtained for parathyroid and 172.0 mg for parenchyma, and in females 266.4 mg for parathyroid and 179.1 mg for parenchyma. In two cases in this "normal" group these limits are exceeded.

(1) In a stout man of 45 years who was 5 ft 6 in tall and 13 stone in weight and who died from acute bronchitis, chronic bronchitis and emphysema, heart failure and cardiovascular hypertrophy without nephritis the parenchyma weighed 156 mg and was well within the above limit, but the parathyroid weighed 388 mg.

(2) In a man of 63 years who died from pyæmia following gastrectomy for gastric ulcers the parathyroid weighed 227 mg and was thus within the tentative limit of the normal but the parenchyma weighed 189.0 mg.

In (1) the glands showed no histological abnormality except congestion and an exceptional amount of adipose tissue. A weight of 388 mg for the glands must, therefore, be accepted as within the limits of the normal, at any rate in stout subjects. In (2) the parenchyma histologically showed no evidence of abnormal hyperplasia and activity. It is necessary, therefore, to accept a parenchyma of 189.0 mg as within the limits of the normal.

In no case, therefore, can the glands be regarded as abnormally heavy if they weigh 388 mg, nor the parenchyma if it weighs 189.0 mg, although in all cases in the "normal" group except these two the corresponding weights are under 266.4 mg and 179.1 mg.

Endocrine abnormalities group There are two differences between the adults in the endocrine and "normal" groups. First in the endocrine groups the weights of both parathyroid and parenchyma are significantly greater in females than in males, the difference in the means for parathyroid being 25.1 ± 10.8 mg and for parenchyma 16.4 ± 7.0 mg. In the "normal" group on the other hand the weights for both parathyroid and parenchyma are not significantly greater in females, that is to say they are not

gether with early ambulation, the fracture will unite solidly, the process of revascularization will not be harassed, good functioning ankle joints will be obtained (certainly in many cases). Subtaloid fusion, therefore, can be reserved for subsequent painful arthritic changes in the joint, replacing the common combined or triple fusions performed in past years unless other factors, e.g., fracture of the lower end of the tibia with ensuing arthritis, necessitate ankle fusion. If excision of the talus should be necessary, it would seem obvious that it should be combined with tibial calcaneal fusion early.

We hope that these observations will be accepted as a preliminary, provocative report. Too few cases have been followed under this regimen to be conclusive, but up to the time of writing they encourage us to continue with the principles of treatment as enumerated, possibly returning with a more comprehensive report in another five to ten years.

SUMMARY

Eighteen cases of fracture-dislocation of the talus, a rather infrequent injury, are being reviewed in the hope that some new light may be shed on the management of this serious injury and complication.

Early open operation and early ambulation (as soon as there is evidence of consolidation of the fracture site with an early zone of revascularization beyond the fracture line) are two of the important points in the management of this condition, since they reduce the period of disability. Anatomical studies of the blood supply of the talus are included, and evidence that early fusion of the ankle and subastragaloid joints does not accelerate the revascularization process is added. In certain cases, however, arthritis of the subastragaloid joint arthritis developed later, necessitating a subastragaloid fusion, but the ankle

joints remained mobile. If excision of the talus is necessary it should be combined with tibial calcaneal fusion.

RESUMEN

18 Casos de fractura-luxación del calcáneo, accidente poco frecuente, se revisan con la esperanza de dar alguna luz en el manejo de este serio accidente y sus complicaciones.

Una operación abierta precoz y ambulación precoz (tan pronto coma haya evidencia de consolidación del punto de fractura con una temprana zona de revascularización más allá de la línea de fractura) son de los más importantes puntos en el manejo de esta condición, ya que reducen el período de incapacidad. Estudios anatómicos del suplemento sanguíneo del calcáneo están incluidos y se agrega la evidencia de que la fusión precoz de la articulación del talón y subastragalina no acelera el proceso de revascularización.

En ciertos casos sin embargo, se desarrolló una artritis de la articulación subastragalina—con fusión de dicha articulación, pero el talón permaneció móvil—Si la resección del calcáneo es necesaria, debe combinarse con fusión tibia calcánea.

ZUSAMMENFASSUNG

Es liegt eine Untersuchung von 18 Fällen von Bruch und Verrenkung des Fersenbeins vor. Der Verfasser hofft, neues Licht auf die Behandlung dieser ziemlich seltenen aber schweren Verletzung und ihrer Komplikationen werfen zu können.

Frühzeitiger chirurgischer Eingriff und frühzeitige Bewegung des Kranken (sobald sich eine Festigung der Bruchstelle und die Wiederherstellung des Blutkreislaufs in der Umgebung der Bruchlinie nachweisen lassen) sind zwei der wichtigsten Punkte in der Be-

thyroid gland the parathyroid weighed 314 mg and the parenchyma 169 mg

In a woman aged 85 years who died from bronchopneumonia and intracranial hæmorrhage following a motor accident and who had a parenchymatous adenoma in the thyroid and an epioophoric cyst in an ovary the parathyroid weighed 273 mg and the parenchyma 120 mg

The glands in both cases were histologically normal, and the heavy weights of parathyroid come within the limit, 388 mg, actually found among the "normal" males

There are two cases in which the weights for both parathyroid and parenchyma exceed the provisional limits

In a man aged 64 years who died from multiple fractures and a lacerated brain due to an accident and who had a colloid and a parenchymatous adenoma in the thyroid gland the parathyroid weighed 308 mg and the parenchyma 187 mg

In a woman aged 65 years who died from pulmonary embolism and who had a pituitary tumour, acromegaly and a colloid goitre the parathyroid weighed 385 mg and the parenchyma 300 mg

In the first case the weights for both parathyroid and parenchyma fall within the limits, 388 mg and 189.0 mg, actually found among the males in the "normal" group. Further the glands were histologically normal. In the second case the parathyroid falls within the normal limit actually found but the parenchyma exceeds it by 111 mg. The parenchyma histologically showed abnormal changes that are associated with excessive activity. The glands in this case of acromegaly must be accepted as abnormal.

The bone abnormalities group This group shows (table VI) no definite variation from the "normal". The actual changes in the bones are shown in table IV.

The nephritis and renal disease groups The nephritis group in both males and females and the renal disease group in males show definitely higher mean weights than the other groups (table VI). The highest values in contrast with the other groups occurred in the males. In the nephritis group there is a higher percentage of parenchyma in the glands, thus in the adult males the mean parenchyma is 75.8 per cent of mean parathyroid as compared with 69.7 per cent in the "normal group," while in adult females the corresponding figures are 74 per cent and 67.7 per cent.

When the individual cases are examined no less than 7 out of the 32 examples of nephritis (table V) have weights for parenchyma that exceed the provisional limits of the normal obtained by taking the means of the "normal" groups for adult males and females *plus* thrice their standard deviation, while 6 of the 7 also have weights for parathyroid that exceed the provisional limits. The weights in these 7 cases with the corresponding types of nephritis (Russell, 1929) are as follows —

Otorhinolaryngologic Surgery

Improvement of Hearing in Otosclerotic Patients by Mobilization of the Stapes Without Incision

M. C. MYERSON, M.D., D.A.B.

BEVERLY HILLS, CALIFORNIA

THE purpose of this paper is to present a method of mobilizing the stapes that does not require an incision and opening of the middle ear cavity.

The idea of attacking fixation of the stapes footplate by mechanical manipulation at the tympanic membrane is not new. In 1884 Lucae¹ designed a rod, the distal end of which was hollowed out in the shape of a cone. This was placed against the short process of the malleus. The rod was attached to a spring mechanism, which, when released, caused it to deliver a thrust that traveled from the short process of the malleus through the ossicular chain. Lucae noted that "early cases" yielded best results. His procedure did not find favor, since it caused considerable pain.

Some years later, Bishop² employed a double-pronged instrument that engaged the handle of the malleus. The malleus was manipulated until "it is felt to move or until the adhesions present are felt to give way." Perhaps the most ingenious technic was that practiced by Large.³ He used a vibrating rod energized by a two-volt motor. The end of the rod was placed upon the short process of the malleus. The motor delivered 500 to 1,500 revolutions per min-

ute. He claimed good results. These technics did not win lasting approval.

Ever since Celsus,⁴ at the beginning of the Christian era, introduced perforation and incision of the drum membrane, there has been a succession of therapeutic and surgical suggestions for the treatment of the hard of hearing. An accurate review of the surgical treatment of deafness could begin with perforation of the drum membrane by Sir Astley Cooper⁵ in 1800. In Cooper's case the eustachian tube was obstructed; his patient's hearing was improved by the perforation. As a result, indiscriminate openings of drum membranes were performed throughout Europe for many years thereafter. Because of early closure of the perforations, the entire membrane was removed. Some surgeons included the bony sulcus. When hearing was not improved by these methods, they removed one or more of the ossicles, on the basis of the assumption that their joints were ankylosed.

That deafness can result from fixation of the stapes was recognized by Valsalva⁶ as far back as 1704. It was principally as a result of the work of Toynbee⁷ between 1841 and 1860 that it became known that fixation of the stapedial footplate occurred in a great majority of cases of deafness. This led to attempts at removal of the stapes and later to its mobiliza- Ke

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.
Submitted for publication Oct. 1, 1956.

TABLE

Weight of parathyroid in mg

Age	Males											
	Normals		Endocrine abnor malities		Bone abnor malities		Renal di cases		Nephritis		Total	
	No	Mean	No	Mean	No	Mean	No	Mean	No	Mean	No	Mean
Under 1 day	4	6.6									4	6.6
1 day-3 mths	5	6.2					1	12.0			6	7.2
3 mths-1 yr	5	25.4									5	25.4
1-5 yrs	11	34.9							1	40.0	12	35.3
6-10 "	5	51.4	1	41.0							6	49.7
11-20 "	7	98.1	1	83.0	2	74.5	1	310.0	2	212.0	13	127.2
21-30 "	12	126.2	1	129.0					2	144.5	15	128.8
31-40 "	18	121.5	3	73.7	3	116.0	2	116.5			26	115.0
41-50 "	24	114.3	13	128.2	2	175.5	1	104.0	4	146.0	44	123.8
51-60 "	43	115.0	17	122.4	4	98.5	1	222.5	7	*580.0	74	132.5
61-70 "	28	116.6	13	153.0	2	81.5	5	155.0	1	110.0	49	128.6
71 and over	4	128.8	4	100.3			1	128.0	1	170.0	10	121.4
Ages 21 and over—												
N	129		51		11		13		14		218	
Mean	117.6 ± 4.0		127.2 ± 7.1		114.2		163.9		188.9		127.0 ± 3.71	
S.D.	45.97		50.57								54.83	

* Including one observation with a parathyroid of 2560 mg and

Weight of parenchyma in mg

Under 1 day	4	5.0									4	5.0
1 day-3 mths	5	4.8					1	11.0			6	5.8
3 mths-1 yr	5	18.0									5	18.0
1-5 yrs	11	25.3							1	25.0	12	25.3
6-10 "	5	38.4	1	29.0							6	36.8
11-20 "	7	72.6	1	67.0	2	50.0	1	276.0	2	160.0	13	99.2
21-30 "	12	93.3	1	87.0					2	119.5	15	96.3
31-40 "	18	87.0	3	55.7	3	92.0	2	97.0			26	84.7
41-50 "	24	76.7	13	88.2	2	128.5	1	90.0	4	115.5	44	86.3
51-60 "	43	80.3	17	77.6	4	68.8	4	169.5	7	*490.5	74	92.4
61-70 "	28	81.4	13	98.9	2	60.0	5	103.4	1	68.0	49	87.1
71 and over	4	80.0	4	68.0			1	94.0	1	123.0	10	80.9
Ages 21 and over—												
N	129		51		11		13		14		218	
Mean	82.0 ± 2.6		83.9 ± 4.3		84.4		121.0		143.2		88.8 ± 2.67	
S.D.	29.99		30.45								39.47	

N = number of observations

ginning at its anterior extremity. Even though the focus can be severed from the surrounding healthy structures, there will not be sufficient normal footplate left for adequate function. The third type consists of involvement of the entire footplate area. In such cases the disease has usually penetrated into the vestibule (Fig. 1C). This is not amenable to any kind of treatment; a good result is not possible.

It would appear that any reasonable method of attack upon the stapediostapedial region would yield the same result in a given case, because the break is bound to come at the point of least resistance. The fracture of the crura so frequently mentioned is simply severance of the crura from the focus involving the footplate. The basis for this is the well known law that when two structures are joined together, the substance of each by itself (the bone of the footplate and crus, and the spongi-

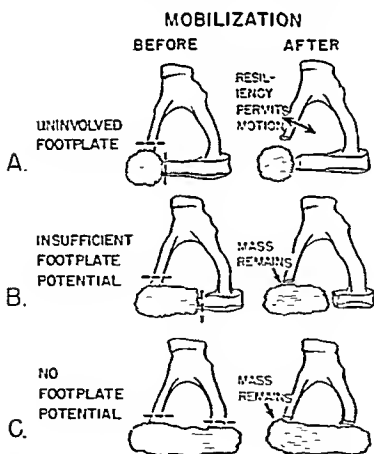


Fig. 1.—Three types of otosclerotic foci. A, ideal for employment of technic described; B, questionable to completely unsatisfactory; C, completely unsatisfactory.

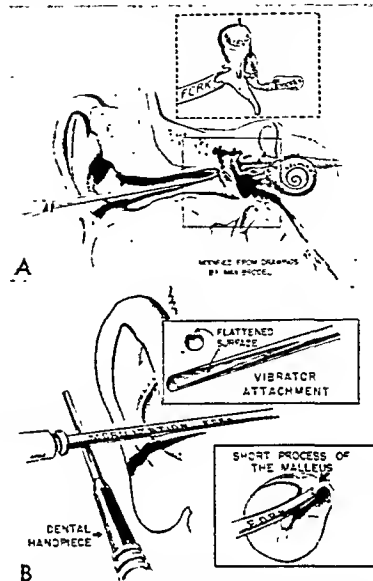


Fig. 2.—A, sketch showing relations of aural structures (frontal view) and placement of forked instrument upon short process of malleus. B, rotating flattened rod in contact with shaft of forked instrument to generate vibrations.

ose bone of the focus) is stronger than the point of contact between them.

If what has just been said is true, it follows that the simpler and less involved the procedure, the better. A procedure of this kind was described in a recent paper.²³ It consists of the placement of a forked instrument firmly over the previously exposed incudostapedial joint. A rod flattened distally 0.014 inch, revolving at 9,000 revolutions per minute, is then brought in contact with the shaft of the fork. The vibrations so generated are sufficient to mobilize the stapes in selected cases.

It was reasoned that if vibrations origi-

TABLE

Weight of parathyroid

Age	Males									
	Normals		Endocrine abnormalities		Bone abnormalities		Nephritis		Total	
	No	Mean	No	Mean	No	Mean	No	Mean	No	Mean
Under 1 day	1	5.0							1	5.0
1 day 3 mths	✓									
3 mths 1 yr	3	16.3							3	16.3
1-5 yrs	2	20.5							2	20.5
6-10 "	2	78.0							2	78.0
11-20 "	4	68.0	2	137.0	1	88.0	1	165.0	8	99.9
21-30 "	1	52.0	3	105.0	1	110.0			5	95.4
31-40 "	5	91.0	3	59.0	1	135.0			9	85.2
41-50 "	7	94.3	3	89.3	2	88.0	1	130.0	13	94.9
51-60 "	4	67.8	1	85.0					5	71.2
61-70 "	1	84.0							1	84.0
71 and over										
Ages 21 and over—	22		12		5		2		41	
N	81.5 ± 6.99		93.3		101.8		147.5		90.7 ± 5.41	
Mean	32.79								34.65	
S.D.										

* One example (parathyroid 504 mg, parenchyma 455 mg)

† One example (parathyroid 305 mg,

Weight of parenchyma

Under 1 day	1	3.0							1	3.0
1 day 3 mths										
3 mths 1 yr	3	12.7							3	12.7
1-5 yrs	2	15.0							2	15.0
6-10 "	2	61.5							2	61.5
11-20 "	4	50.5	2	105.0	1	71.0	1	128.0	8	76.4
21-30 "	1	36.0	3	74.3	1	72.0			5	66.2
31-40 "	5	72.4	3	45.3	1	114.0			9	68.0
41-50 "	7	68.0	3	74.7	2	47.0	1	95.0	13	68.4
51-60 "	4	49.0	1	68.0					5	52.8
61-70 "	1	61.0							1	61.0
71 and over										
Ages 21 and over—	22		12		5		2		41	
N	60.6 ± 5.46		71.8		70.2		111.5		67.5 ± 4.38	
Mean	25.61								28.03	
S.D.										

N = number of observations

ness. In some cases the forked instrument may make contact with the drum membrane adjacent to the short process and cause some degree of trauma. Hemorrhage and swelling always follow the use of this technic, but the membrane returns to normal in seven to fourteen days.

The number of cases in which this method has been applied are too few at present to justify analysis. At a future date, when a sufficient number of cases is available, an analysis of results will be reported.

It should be emphasized that when the trans-ossicular vibratory technic does not yield results, the middle ear cavity is exposed in the usual manner and vibrations applied at the incudostapedial articulation, and the footplate as indicated.

SUMMARY

The author describes a technic of mobilization of the stapes without incision, based on the idea of attacking fixation of the stapedial footplate by mechanical manipulation at the tympanic membrane. Complications are minimal and certain dangers of the incisional procedure are eliminated. The method has not yet been used in a sufficient number of cases for a definitive report, but thus far the results seem promising.

ZUSAMMENFASSUNG

Der Verfasser beschreibt eine Technik der Mobilisierung des Steigbügels ohne Einschnitt. Das Verfahren beruht auf dem Gedanken, die Fixierung der Fussplatte des Steigbügels durch mechanische Manipulation am Trommelfell anzugreifen. Die Komplikationen sind äusserst geringfügig, und gewisse dem Einschnittverfahren anhaftende Gefahren werden ausgeschaltet. Die Anzahl der bisher mit der

Methode des Verfassers behandelten Fälle reicht noch nicht für einen abschliessenden Bericht aus. Die bisherigen Ergebnisse scheinen jedoch ermutigend zu sein.

RIASSUNTO

L'autore descrive una tecnica di mobilizzazione delle staffe senza incisione, basandosi sull'idea di fissare la base delle staffe manipolando meccanicamente la membrana del timpano. Minime sono le complicazione e, inoltre, viene eliminato il pericolo derivante dalla incisione. Il metodo non è stato finora usato in un numero tale di casi da poterne fare una relazione completa, ma i risultati fin qui ottenuti si dimostrano ben promettenti.

RESUMEN

El autor describe una técnica de movilización del estribo sin incisión, basado en la idea de atacar la fijez de la base del estribo por manipulación mecánica en la membrana timpánica. Las complicaciones son mínimas y los peligros del procedimiento con incisión son eliminados. El método no ha sido usado aún en un número suficiente de casos para dar un reporte definitivo, pero hasta la fecha los resultados son prometedores.

RÉSUMÉ

L'auteur décrit une technique de mobilisation des étriers sans incision, basée sur la fixation de la lame de l'étrier par une manipulation mécanique de la membrane tympanale. Il réussit ainsi à limiter les complications et à éviter certains dangers de la méthode sanglante. Cette technique n'a pas été utilisée dans un nombre de cas suffisants pour permettre des conclusions définitives, mais ses résultats semblent prometteurs.

the parathyroid weight was within that (388 mg) found in another exceptional "normal" case. The histological appearances resembled those in the nephritis group other than case (1).

The correlation between hyperplasia of the parathyroid glands and changes in the kidneys in nephritis and other renal disease will be described more fully by one of us in another paper. The above examination is, however, sufficient to show that the nephritis and renal groups must be excluded in an attempt to find the weights of parathyroid glands free from abnormal activity.

Comparison of the groups with three glands (table VII)

The mean weight of the glands of the males exceeds that of the females in contrast to the results obtained with four or more glands. The mean weight of the parathyroid glands for adult males is approximately three-quarters of the value found for four or more glands, but the mean for adult females is only a little over half the mean found for four or more glands.

When the individual cases are examined two are found in which the weights exceed the provisional limits of the mean plus thrice the standard deviation of four or more glands in the "normal" group.

(1) Female, aged 21, nephritis acris in late stage, parathyroid 305 mg, parenchyma 256 mg.

(2) Female, aged 61, bronchopneumonia, pernicious anemia, areas of atrophy and infiltration of thyroid alternating with areas of abnormal activity, cortical adenoma in suprarenal body, parathyroid 504 mg, parenchyma 455 mg.

Case (1) is another example of parenchymatous hyperplasia in nephritis. In case (2) the weights of both parathyroid and parenchyma greatly exceed those actually found in the exceptional glands in the "normal" group. Only one of the three glands was enlarged. Histologically it showed great hyperplasia in contrast to the two small glands. An abnormal hyperplasia was undoubtedly present, but its cause is not clear. Sections from the neck of a femur show a general moderate osteoporosis and several small areas in the cortex of active osteoclastic resorption with fibrosis of the marrow. The osteoporosis might be explained by the age of the patient, but not the areas of active resorption. It is possible that an extensive histological examination of the skeleton would have shown that this was an example of slight generalised osteitis fibrosa. If so it should have been included in the bone abnormalities group rather than the endocrine.

The greater the experience that anyone obtains in finding the parathyroid glands the less often are only three glands found. When this is taken into consideration as well as the small means

Surgical Treatment of Diseases of the Parotid Gland

ORION H. STUTEVILLE, M.D., D.D.S., F.A.C.S.

CHICAGO, ILLINOIS

THERE are three large categories of disease of the parotid gland that may require surgical intervention, namely, inflammatory diseases, tumor and trauma. For the purpose of this article, inflammatory diseases and injuries will be described briefly and the treatment of choice indicated, while the treatment of benign and malignant tumors of the parotid gland will be discussed in some detail.

Some of the inflammatory diseases of the parotid that occasionally require operation are complications of mumps, obstruction of the parotid duct by calculi, acute parotitis and secondary involvement of the gland in tuberculosis.

The most common disease of the parotid gland is mumps. Mumps in itself does not require surgical treatment, but its complications occasionally produce conditions that need surgical treatment, as the following case illustrates.

REPORT OF CASES

CASE 1.—A 10-year-old boy had mumps several weeks prior to his presentation at the clinic. He complained of swelling of the side of the face, with pain. When pressure was applied over the swelling, which was in the parotid region, thick yellowish pus could be expressed from Stensen's duct. This was treated by dilation of the ducts and application of hot wet packs at home. Culture and sensitivity tests revealed that the organism was a staphylococcus, sensitive to penicillin

and several other antibiotics. Penicillin was given, but the condition continued. After about two weeks' treatment the abscess area closed off and no longer was connected to the duct system. At this time incisional drainage was performed, and the patient made an uneventful recovery.

A second disease of the parotid gland that requires operation is obstruction of the parotid duct, or Stensen's duct, by calculi or inflammation. Obstruction of the gland's secretions may produce an inflammatory reaction and swelling. Secondary infection may result, with bacteria traveling up the duct and producing acute or chronic parotitis; also, the infection can be brought in by the blood stream.

CASE 2.—A 42-year-old man had a considerable swelling of the right side of the face, in the parotid region, of three days' duration. He was in extreme pain and was unable to eat, since any movement of the jaw increased the pain. Examination revealed a hard white mass at the orifice of Stensen's duct. The orifice was dilated and incised, and two stones, measuring 4 by 3 mm., were delivered. This was followed by copious drainage of thick yellow pus. The patient made an uneventful recovery and has had no further trouble.

CASE 3.—A 42-year-old Negro housewife was admitted to the hospital complaining of recurrent swelling in the left parotid region for the past eighteen years. During the past six months she had had constant swelling, with persistent drainage of thick yellowish material from Stensen's duct, considerable pain and a disagreeable taste in the mouth at all times. Examination revealed a pronounced swelling in the left parotid region, with drainage of thick yellowish pus from the left Stensen's duct when pressure was applied over the area. Exploration of the duct by means of a metal probe revealed it to be dilated. There were no foreign bodies or stones. Roentgen

From the Maxillofacial Departments, Northwestern University; Evanston Hospital, Evanston, Illinois; Cook County Hospital and Passavant Hospital, Chicago, Illinois.
Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1955.
Submitted for publication Oct. 1, 1955.

of the case of acromegaly. No reason was found for excluding the cases in the bone abnormalities group. On the other hand the groups of nephritis and renal disease contained so many glands which were of unusually great weight and showed evidence of abnormal hyperplasia that both these groups must be excluded. In order, therefore, to make use of as many histologically normal glands as possible the bone and endocrine groups, excluding the case of acromegaly, have been added to the "normal" group.

The figures for this group of histologically normal glands are given in table IX.

The mean weights have risen above those in the "normal" group of table VI by 0.9 mg for the male parenchyma, 3.2 mg for the male parathyroid, 4.2 mg for the female parenchyma and 8.4 mg for the female parathyroid.

In both parathyroid and parenchyma the glands of males have slightly heavier weights in ages under 5 years, but in ages over 5 years both weights are definitely greater in females than in males. In adults the difference between the mean weight for females and males is 18.96 ± 5.70 for parathyroid and 10.22 ± 3.65 for parenchyma, both these differences being statistically significant.

If the means plus thrice the standard deviations are taken as a measure for the upper limits of weights, then the upper limits for adult males are 263 mg for parathyroid and 174 mg for parenchyma, and for adult females 295 mg and 193 mg respectively.

Among the cases of which some details have been given above there are three males and one female in whom one or other or both of these limits have been exceeded.

Male, aged 63	Parenchyma 189 mg	("Normal" group)
Male, aged 64	Parathyroid 308 mg	parenchyma 187 mg (Endocrine group)
Male, aged 45	Parathyroid 388 mg	("Normal" group)
Female, aged 52	Parathyroid 314 mg	(Endocrine group)

Clearly, therefore, in glands showing no histological evidence of abnormal activity the upper limit of weight of parathyroid is at least 388 mg and of parenchyma 189 mg. On the assumption, however, of a normal distribution the odds are 740 to 1 against weights as great or greater than the mean plus thrice the standard deviation, that is to say 263 mg for parathyroid and 179 mg for parenchyma in males and 295 mg for parathyroid and 193 mg for parenchyma in females, while the odds against parathyroid weighing 388 mg are 100,000,000 to 1, and against parenchyma weighing 189 mg are 4298 to 1.

The literature upon the weight of the parathyroids is scanty. Welsh (1897-98) gives the average weight of fresh parathyroid (probably one parathyroid) as 35 mg, with variations from 10 to 100 mg or more. Marrison 1911, quoted by Pappenheimer and Wilens, gives the average weight of one

most common is the mixed cell tumor which is generally classified as benign. In my opinion, however, all mixed cell tumors are potentially malignant. In this article the malignant tumors will not be broken down into the various small classifications but will be discussed only as malignant mixed cell tumors and muco-epidermoid tumors. The benign tumors will be discussed rather briefly.

CASE 6.—A 35-year-old Negress presented herself with a large tumor (about 4 cm. in diameter) below the lobe of the right ear. It was freely movable and not attached to the surrounding structures. It appeared to be external to the mandible. The tumor was removed, together with a wide margin of normal gland. It was well encapsulated. The pathologist's diagnosis was benign mixed cell tumor of the parotid gland. The patient made an uneventful recovery and at the time of writing, ten years after the operation, has had no recurrence.

The dissection by which these benign tumors are removed requires care, since it is important to preserve the facial nerve and to avoid unnecessary damage to the surrounding structures. If the tumor is located in the superficial portion of the gland, it is usually simple to make an incision of the Esmarch type, reflect the skin flap and remove the entire superficial lobe without disturbing any branches of the facial nerve or the duct of the gland.

If the tumor is located in the deep lobe behind the ramus of the mandible, however, it is necessary first carefully to trace back the branches of the facial nerve under or through the superficial lobe and isolate the entire nerve. When the nerve has been isolated so that it can be protected, the tumor is removed, with a wide margin of normal tissue. If, in removing the tumor, it appears that the duct system has been damaged to such an extent that the postoperative course will be complicated, it is often better to remove the entire gland.

All such tumors should be removed

widely. At no time should a biopsy specimen be taken. If, however, at the time of operation the surgeon suspects that the tumor may be malignant, a frozen section should be done. A pathologic report of malignant tissue would indicate a block dissection, with removal of the entire mass in one piece (including the facial nerve if it is centered in the mass), the external carotid artery and all the surrounding tissues. Block dissection insures a much longer survival than does removal of the tumor piecemeal in an effort to save the surrounding structures.

CASE 7.—A 48-year-old white man was admitted to the hospital with a mass measuring about 3 inches (7.5 cm.) in diameter in the right parotid region. He stated that a small tumor had been present in the same region for about twenty years. The tumor had grown slowly and finally had become so large as to be troublesome. There was no pain and no weakness of the facial nerve. The tumor was freely movable and did not appear to be attached to the surrounding structures.

At operation it was noted that the tumor was well encapsulated. The entire gland was removed and the facial nerve preserved. There was no apparent infiltration into the surrounding tissues. The wound was closed and healed well. There was no facial paralysis, and the patient made a good recovery. The pathologic report described the growth as a malignant mixed cell tumor of the parotid gland, well encapsulated. The patient returned to work and was seen periodically for check-ups. Eighteen months after the operation it was noted that a small tumor had appeared on the upper lip, in the mid-line, measuring about 1 cm. in diameter and protruding from the skin. This was excised, and the pathologic diagnosis was anaplastic squamous cell carcinoma. Roentgenograms were taken of the skull at the time. These revealed several punched out areas in the calvaria, in the midline, measuring up to 1 cm. in diameter. The patient was readmitted for irradiation, and it was observed that there was some swelling in the region of the old right parotid scar. After a full course of therapy the patient was discharged to a nursing home, where he died one year later, or two and one-half years after the original operation. Autopsy revealed generalized carcinomatosis.

gland as 20 to 50 mg and a weight for the four glands of 80 to 120 mg Danisch (1924) in 42 cases between the ages of 21 and 60 gives the average weight of the upper, apparently one upper, as varying from 26 to 31 mg and of the lower as 37 to 40 mg. Comparable figures are given for subjects over 60 years of age, without mentioning the number of examinations. Marine (1928) gives an average weight of an upper gland as 20 mg and of a lower 35 mg, the source of the figures not being stated. Authors who give the number of cases and the sex are quoted below. The figures are for adults and for four glands, except in the case of Pappenheimer and Wilens whose figures were calculated from material of which little more than half was complete with four glands.

	Present data		Albara (1931)		Pappenheimer and Wilens		Freeman (1934)			
							White		Negro	
	No	Mean	No	Mean	No	Mean	No	Mean	No	Mean
Males	191	120.8 mg	13	78.6	<40	106	470	151.1	274	166.2
Females	130	139.7 "	11	66.0	<30	130	203	146.2	183	165.4

The striking difference between the means obtained by Freeman and those found from our histologically normal series is that while his value for white females is slightly above ours his value for white males is considerably higher. In the data of Pappenheimer and Wilens the females have as in our series a larger mean than the males, but both means are below ours.

CORRELATIONS

Correlations with age. From tables VI and IX, we would be justified in saying that the mean weight of the female parathyroids increases with advancing age, certainly up to the age of 50 years. In the males, however, the parathyroids are apparently at their maximum weight at 21 to 30 years and then decline slightly to reach a constant level at and after 41 years.

Pappenheimer and Wilens divided their data into two age groups, under 45 and 45 years and over, and found that for females the mean weights of the parathyroids were 144 mg and 112 mg respectively. They argued "The inference which is suggested, if not proved by our data is that the age period of sexual activity in females is marked by a definite increase in the weight of the parathyroid." No figures are given for males but it is stated that "A similar analysis of the weights of male glands discloses no comparable difference in the two groups." The small number and the methods used by Pappenheimer and Wilens in obtaining their means must be considered with their results.

In table X the percentage volume of parenchyma and the percentage of fat in the interstitial tissue are given in the "normal" and endocrine groups together. The mean percentage of parenchyma shows a slight decline with age, greater in females

ameter. It was freely movable and not painful. The preoperative diagnosis was tumor in the accessory lobe of the parotid gland. An incision was made parallel to the duct and over the tumor. It was removed by excising the entire accessory lobe and dissecting it free from Stensen's duct. The pathologic diagnosis was muco-epidermoid carcinoma of the salivary gland. The wound healed well, and the patient has had no recurrences at the time of writing, five and one-half years after the operation.

CASE 10.—A 23-year-old white man was admitted to the hospital with a mass in the left parotid region, just below the lobe of the ear, in the region of an earlier surgical incision. The mass measured about 1 cm. in diameter. It was rather diffuse and was attached to the surrounding structures. A tumor had been removed from the area two years and four months earlier. The pathologic diagnosis at that time was muco-epidermoid carcinoma of the parotid gland. The entire left parotid gland was removed without injury to the seventh nerve. The mass was located in the superficial portion of the gland and appeared to be a scar formation rather than tumor tissue. A frozen section showed fibrous tissue and chronic inflammatory reaction of the parotid gland. Since there were no palpable nodes and no evidence of metastases, radical neck dissection was not performed. The wound healed well. Paresis of the lower part of the face appeared on the second postoperative day but cleared in about six weeks. The final pathologic diagnosis was chronic fibrosis of the parotid gland. No tumor has been observed on subsequent routine examinations, although the patient has been followed only for four months.

It must be remembered that there are other tumors involving the parotid gland that require surgical treatment. The other true parotid tumors are Warthin's tumor and oxyphilic adenoma. These are classified as benign tumors; nevertheless, they should be removed with a good margin of normal tissue. Tumors of any of the normal structures may also occur in the parotid region, such as hemangiomas, lymphangiomas, lipomas, fibromas, neuromas and tumors of the muscle tissue, and the diagnosis can be made only by removing

the tumor and obtaining a histologic report. Metastasized tumors from other parts of the body also occur occasionally in the parotid region.

SUMMARY

There are three classes of parotid gland disease that require surgical treatment, namely, inflammatory disease, tumor and trauma. In the individual case, treatment ranging from simple drainage to wide block dissection, including radical neck dissection, may be necessary. Four types of inflammatory complications requiring surgical treatment are described: (1) complications of mumps; (2) obstruction of the parotid duct by calculi or inflammation; (3) acute parotitis, and (4) secondary involvement of the parotid gland in tuberculosis.

The discussion of tumors of the parotid gland includes (1) mixed cell tumors, both benign and malignant; (2) muco-epidermoid tumors, and (3) other benign tumors in the region of the parotid gland. (No attempt is made to break down the classifications of the malignant tumors of the parotid gland, except to separate the muco-epidermoid from the general classification.)

Injuries to the parotid region are discussed including injuries to the gland itself and to Stensen's duct.

CONCLUSIONS

Treatment of inflammatory diseases of the parotid gland requiring surgical intervention is accomplished by drainage, relief of obstruction or, in the case of tuberculosis with secondary involvement of the parotid gland, resection of the affected parts.

A fistula resulting from lacerations to the face and penetrating to S

La disección radical de cuello no acompaña necesariamente el tratamiento de los tumores malignos de la parótida, ya que la experiencia del autor demuestra que la mayoría de estos tumores dan mas metástasis generales a través del torrente sanguíneo que locales a través de los linfáticos cervicales.

El tumor mucoepidermoide que es siempre maligno debe ser tratado por una excisión amplia. Es una controversia si debe ó no hacerse una disección radical de cuello, pero si hay ganglios palpables ó si el tumor es de alto grado de malignidad, la disección radical sí esta indicada.

Una fistula resultante de heridas de la cara penetrantes al conducto de Stensen se trata, cerrando la fistula y causando degeneración de la glándula, anastomizando el conducto ó haciendo una diversión del trayecto fistuloso al interior de la cavidad oral.

SCHLUSSFOLGERUNGEN

Die Behandlung chirurgischen Eingriff erfordernder entzündlicher Erkrankungen der Ohrspeicheldrüse erfolgt durch Drainierung, Behebung von Obstruktionen oder — in Fällen von Tuberkulose mit sekundärer Beteiligung der Ohrspeicheldrüse — durch Resektion der befallenen Teile.

Der Verfasser ist der Meinung, dass alle Mischgeschwülste potentiell bösartige Tumoren sind, und dass daher die radikale Entfernung dieser Geschwülste von lebenswichtiger Bedeutung ist. Niemals sollte eine sogenannte Probeexzision ausgeführt werden. Ein während der Operation vorgenommener Gefrierschnitt kann jedoch von Nutzen sein. Wenn der pathologische Bericht eine bösartige Geschwulst ergibt, kann man mit einer viel längeren Lebensdauer rechnen, wenn man eine Blockresektion ausführt, anstatt sich mit einer stückweisen Entfernung der Ge-

schwulst zu begnügen mit dem Ziel, die umliegenden Gebilde zu schonen.

Es ist nicht unbedingt notwendig, die Operation von bösartigen Geschwülsten der Ohrspeicheldrüse durch eine radikale Resektion der Halslymphdrüsen zu ergänzen, da nach der Erfahrung des Verfassers diese Geschwülste meist auf dem Blutwege und nicht lokal über die Halslymphknoten metastasieren.

Die mukoeidermoide Geschwulst, die stets bösartig ist, sollte durch weite Resektion behandelt werden. Die Frage, ob hier eine radikale Resektion der Halslymphknoten vorgenommen werden soll oder nicht, lässt sich noch nicht einstimmig beantworten. Wenn jedoch tastbare Lymphknoten vorliegen oder die Geschwulst einen hohen Grad von Bösartigkeit aufweist, dann liegt die Indikation zur radikalen Halsdrüsenresektion vor.

Von Gesichtswunden mit Verletzung des Stensenschen Ganges herrührende Fisteln werden durch Schliessung der Fistel, was zur Degenerierung der Drüse führt, behandelt oder durch Anastomisierung des Ganges oder durch Ableitung des Fistelkanals in die Mundhöhle.

CONCLUSOES

O tratamento dos processos inflamatórios da parotida requerem tratamento cirúrgico com drenagem, desobstrução ou, em caso de tuberculose secundária, a ressecção das porções atingidas.

O A. acha que todos os tumores de celulas mixtas são potencialmente malignos. Considera vital a excisão de tais tumores. Desaconselha as biopsias como são feitas mas insiste que os exames de congelação podem ser uteis no momento da intervenção. Se o resultado da histo-patologia indica malignidade a sobrevida não será prolongada apenas pela excisão simples do tumor porem considera necessário que seja feita uma dissecação em monobloco, atingi-

Plastic and Reconstructive Surgery

Cutaneous Carcinoma of the Nose and Ear

CHARLES C. GRACE, M.D., F.A.C.S., F.I.C.S.

ST. AUGUSTINE, FLORIDA

THE intensive educational crusade against cancer, which has held sway over the past decade, has made the public ever more alert in the recognition of this dread disease. As a direct result, more early cancers of the skin are recognized than ever before. It is the purpose of this paper to direct attention to a too seldom used method of dealing with early malignant lesions of the nose and ear that will produce cosmetic results and cures gratifying to both the patient and the surgeon.

A nose or an ear may not be architecturally perfect, but it is a portion of a person's physiognomy that is constantly on exhibition. It is, therefore, understandable that a patient is justifiably unhappy when a part, or all, of either organ is disfigured or destroyed by injudicious treatment.

The atrophy of the skin and the telangiectasis produced by roentgen rays and radium are not only deforming but in themselves dangerous. The areas subjected to this therapy can never again be exposed to the direct rays of the sun for any length of time. In addition, carcinomas of the skin may develop upon irradiated areas.¹ Martin and Stewart² and others have reported the highly malignant and invasive spindle cell epidermoid carcinoma arising from previously irradiated sites.

Role of Sunlight.—It is generally agreed that prolonged exposure to sunlight of high ultraviolet content may cause cancer of the skin. The races of mankind over hundreds of years have adjusted themselves to their zones of habitation, as may be noted in the ruddy complexion of the blond, blue-eyed Nordic, the darker skin of the Mediterranean peoples and the deeply pigmented skin of the Negro race from the equatorial regions of Africa. Ackerman and Regato³ observed that carcinoma of the skin seems to develop after chronic exposure to solar rays much more frequently in average Scandinavians and North Germans than in persons with coarser or darker skin. It is well known, they added, that Arabs, South American Indians and Negroes are only slightly susceptible, and they ascribed the definite racial differences in susceptibility to the texture of the skin and its pigment content. Boyd³ named exposure to bright sunlight as an apparent causal factor of basal cell carcinoma of the skin. He noted that the incidence of this disease is extremely high in Australia, where as many as 50 cases a day may be encountered in the outpatient department of a Sydney hospital. The conditions there are peculiar, for in that country with a tropical sun, especially strong light and low humidity, there is white labor only. In other tropical countries pigment-protected skins shield those continually exposed to the brilliant glare. The relative immunity of the large Italian element in Australia's labor population is

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1936.
Submitted for publication Sept. 23, 1936.

TABLE XIV
Ages 21 and over
Correlation coefficients for "normal" and endocrine groups separately

	Males.				Females			
	Parathyroid		Parenchyma		Parathyroid		Parenchyma	
	Normals	Endocrine disorders	Normals	Endocrine disorders	Normals	Endocrine disorders	Normals	Endocrine disorders
	r	r	r	r	r	r	r	r
Heart	1762 ± 080	3492 ± 123	1290 ± 097	3678 ± 121	2184 ± 124	1492 ± 124	1269 ± 128	1902 ± 122
Liver	1289 ± 087	0571 ± 141	1733 ± 085	0853 ± 110	3286 ± 110	2827 ± 117	2558 ± 122	3012 ± 115
Kidneys	0977 ± 088	3360 ± 125	1065 ± 087	4082 ± 118	1733 ± 126	5738 ± 086	0785 ± 129	6055 ± 081
Adrenals	0693 ± 088	— 0780 ± 139	1097 ± 087	— 0630 ± 139	— 0471 ± 129	0564 ± 129	— 0082 ± 129	0024 ± 128
Pituitary	1272 ± 087	— 0737 ± 142	1229 ± 087	— 1310 ± 140	1037 ± 129	2756 ± 118	— 0486 ± 130	3168 ± 115
Thyroid	1648 ± 080	2705 ± 129	1607 ± 080	1957 ± 135	— 0594 ± 130	0744 ± 126	— 0795 ± 129	1760 ± 123
Thymus	0750 ± 080	3046 ± 130	0289 ± 089	1645 ± 139	2363 ± 124	0350 ± 128	0368 ± 131	1242 ± 126
Body weight	3153 ± 079	2001 ± 136	1980 ± 085	2138 ± 135	3838 ± 110	4047 ± 099	3074 ± 117	4073 ± 105



Fig. 1.—Results of roentgen rays.

ever, the higher the concentration of ultraviolet rays in the sunlight. In a study of 25,000 specimens of surgical tissues over a period of eight years in Virginia, Phillips⁷ noted only a few epitheliomas. During a similar period in central Texas, the incidence of cancer of the skin in the tissues examined in his laboratory was 1 in 20. For Mexicans the incidence was rather low, and it was still lower for Negroes.

A study of 20 collected cases of carcinoma of the skin in Negroes led Schrek⁸ to report a comparable number of lesions in the exposed and unexposed areas and an equal distribution between the sexes. He concluded that chronic inflammatory lesions are more important than solar rays as a causative factor of this disease in this race and that, although carcinoma of the exposed skin occurs much less frequently in the Negro than in the white race, the incidence is the same for the two races for carcinoma of the covered areas of the skin. In addition, he noted that in the white race cutaneous cancer occurs with greater frequency in the southern than in the northern states, but regarded the incidence in Negroes as unaffected by geographic factors.

Howles,⁹ in his study of 2,220 cases of epithelioma of the skin collected from the records of Charity Hospital in New Or-

leans, included these mortality statistics on carcinoma of the skin in the United States: The percentage of deaths among Negroes from this disease for the years 1923 to 1927 was 1.4, while in 1927 the percentage of deaths among the whole population was 2.8. The race and sex incidence in his series was: white male patients, 1,579, or 71 per cent; white female patients, 550, or 20.4 per cent; Negroes, 54, or 2.4 per cent; and Negresses, 37, or 1.6 per cent. In these cases the nose and ear were exceeded only by the cheeks and lips as the most frequent sites of the lesions; in 360 cases, or 16.21 per cent, the tumor involved the nose, and in 126, or 5.67 per cent, the ear.

Carcinomatous lesions of the skin were first produced experimentally by ultraviolet radiation in 1928, when Findlay¹⁰ reported that white mice manifested "papillomas and malignant epitheliomas" after eight months of daily minute exposures to radiation from a mercury vapor lamp. His work has been repeatedly confirmed, both with light from a mercury vapor lamp and with sunlight, and it has been estimated that the carcinogenic rays are those of wavelengths between 2,537 and 3,200 angstrom units, which lie in the same spectral region as those which produce the erythema of "sunburn" and the antirachitic effects of sunlight.⁴

diseases, and a large "normal" group of the remainder. Particulars of the abnormalities in the first four groups are given in tables II to V

TABLE XV

Ages 21 and over

"Normals" + endocrine abnormalities—constants and correlation coefficients

Parathyroid	Males				Females			
	No	Mean in mg	Standard deviation	Coefficient of variation	No	Mean in mg	Standard deviation	Coefficient of variation
Right upper	145	26.03 ± 1.02	12.32	47.34	100	31.55 ± 1.65	16.54	52.43
Right lower	145	33.03 ± 1.21	14.52	43.96	100	38.10 ± 1.87	18.65	48.90
Left lower	145	35.00 ± 1.44	17.28	49.38	100	40.20 ± 2.11	21.10	52.49
Left upper	145	26.69 ± 1.30	15.69	58.79	100	32.45 ± 1.73	17.26	53.19

Parathyroid	Males	Females
Right upper and right lower	4234 ± 0.68	1965 ± 0.96
Right upper and left lower	6005 ± 0.53	3057 ± 0.91
Right upper and left upper	7161 ± 0.40	3579 ± 0.87
Right lower and left lower	5424 ± 0.59	3221 ± 0.90
Right lower and left upper	4383 ± 0.67	2440 ± 0.94
Left lower and left upper	6409 ± 0.49	3871 ± 0.85

(2) These groups were analysed and compared. The endocrine group differs from the "normal" group in two ways. First, both parathyroid and parenchyma are significantly greater in adult females than in adult males in the endocrine group but not in the "normal". Secondly the parathyroid but not the parenchyma is significantly greater in females of the endocrine group than in females in the "normal" group. No explanation could be found of these differences.

(3) The two renal groups contain relatively numerous examples of unusually large glands showing histological evidence of abnormal activity. The endocrine group contains one (4 glands) associated with acromegaly and another (3 glands) associated with excessive resorption of bone. To obtain the weights of histologically normal glands the adults with four or more glands in the "normal," bone abnormalities, and endocrine groups, excepting the case of acromegaly, were, therefore, examined as a series of 191 males and 130 females.

(4) In this histologically normal series the weights of the whole glands range from 3 mg in an infant of 6 hours to 388 mg in a man of 45 years. The glands of two adult males weigh 308 and 388 mg respectively, the parenchyma in the former weighs 187 mg and in a third male 189 mg. With these exceptions the weights

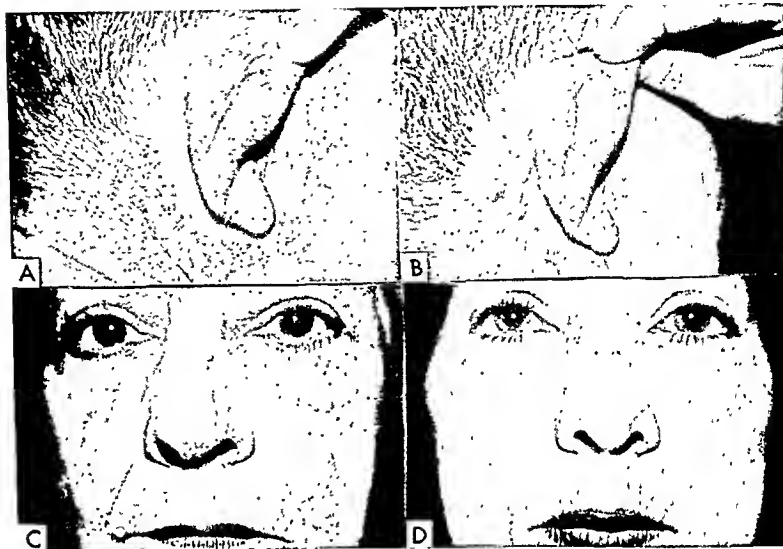


Fig. 3.—A, squamous cell carcinoma. B, results two years later. C, basal cell carcinoma of dorsum of nose. D, nose after two years.

vated rolled edge. The center is frequently crusted, and removal of the crust may reveal a raw, bleeding area or a glistening whitish surface. This tumor is especially inclined to be deeply invasive when over cartilage or bone. The rodent ulcer is a burrowing, mutilating ulcerative process that may continue until it destroys the entire ear or nose.

The squamous cell carcinoma usually arises from an existing precancerous lesion, such as a wart, keratosis, an ulcer, a pimple or a scab. Removal of the keratotic projection discloses a slightly bleeding base, with eventual ulceration. The borders are indurated; the lesion may be superficial, or there may be deep projection and invasion, and also fixation to deeper structures.¹² Not only is this tumor ulcerative and destructive, but it readily metas-

tasizes to the regional lymph nodes. In a series of 256 cases of squamous cell epithelioma of the skin analyzed by Broders,¹⁴ the average duration of the lesions in patients with metastasis was two and sixty-seven hundredths years, in those without metastasis, five and three hundredths years, and in those in whom no regional lymph nodes or salivary glands were removed, four and seventy-eight hundredths years. Ward and Hendrick¹¹ stated that it is an established fact that the younger the patient the more rapid the growth of squamous cell lesions.

The slit lamp, with its magnification and concentration of light, is an invaluable aid in the study and diagnosis of cancer of the skin. Small areas of infiltration may be seen which otherwise would escape attention. Adequate biopsy should always

diseases, and a large "normal" group of the remainder. Particulars of the abnormalities in the first four groups are given in tables II to V

TABLE XV

Ages 21 and over

"Normals" + endocrine abnormalities—constants and correlation coefficients

Parathyroid.	Males				Females			
	No	Mean in mg	Standard deviation	Coefficient of variation	No	Mean in mg	Standard deviation.	Coefficient of variation.
Right upper	145	26.03 ± 1.02	12.32	47.34	100	31.55 ± 1.05	10.54	52.43
Right lower	145	33.03 ± 1.21	14.52	43.96	100	38.10 ± 1.87	18.05	48.90
Left lower	145	35.00 ± 1.44	17.28	49.38	100	40.20 ± 2.11	21.10	52.49
Left upper	145	26.69 ± 1.30	15.09	58.79	100	32.45 ± 1.73	17.26	53.19

Parathyroid.	Males	Females
Right upper and right lower	4234 ± 068	1905 ± 096
Right upper and left lower	6005 ± 053	3057 ± 091
Right upper and left upper	7161 ± 040	3579 ± 087
Right lower and left lower	5424 ± 059	3221 ± 090
Right lower and left upper	4383 ± 067	2440 ± 094
Left lower and left upper	6409 ± 049	3871 ± 085

(2) These groups were analysed and compared. The endocrine group differs from the "normal" group in two ways. First, both parathyroid and parenchyma are significantly greater in adult females than in adult males in the endocrine group but not in the "normal". Secondly the parathyroid but not the parenchyma is significantly greater in females of the endocrine group than in females in the "normal" group. No explanation could be found of these differences.

(3) The two renal groups contain relatively numerous examples of unusually large glands showing histological evidence of abnormal activity. The endocrine group contains one (4 glands) associated with acromegaly and another (3 glands) associated with excessive resorption of bone. To obtain the weights of histologically normal glands the adults with four or more glands in the "normal," bone abnormalities, and endocrine groups, excepting the case of acromegaly, were, therefore, examined as a series of 191 males and 130 females.

(4) In this histologically normal series the weights of the whole glands range from 3 mg in an infant of 6 hours to 388 mg in a man of 45 years. The glands of two adult males weigh 308 and 388 mg respectively, the parenchyma in the former weighs 187 mg and in a third male 189 mg. With these exceptions the weights

of carcinoma of the skin in areas about the face, the site of the lesion in 13 was the nose and in 11 the ear. Thirteen of the 24 patients were men and 11 were women. There were 8 basal cell carcinomas, 11 squamous cell, 3 mixed and 2 precancerous. Of the 13 lesions of the nose, 8 were basal cell, 2 squamous cell, 2 mixed and 1 precancerous; of the 11 carcinomas of the ear, 9 were squamous cell, 1 mixed and 1 precancerous. The fact that there were 9 squamous cell and no basal cell lesions of the ear are in contrast to the 8 basal cell and 2 squamous cell lesions of the nose. More than five years have elapsed in 6 and more than two years in 10 of the 24 cases since excision and skin grafting of the lesion by the method described. There have been no recurrences, and only 1 patient has died, from unrelated cardiovascular disease. The cosmetic results have been uniformly excellent, and in no case has there been difficulty in getting the graft to grow. Figures 1 to 3 are illustrative.

SUMMARY

Exposure to direct sun rays of high ultraviolet intensity is a predominant factor in the causation of carcinoma of the skin in persons of certain racial stock. The lighter and thinner the skin, the greater the chance of cutaneous cancer if exposure takes place over a long enough period.

Irradiation should be used with extreme caution, and only by the best qualified radiologists, in the treatment of cancerous lesions of the nose and ear.

In the treatment of early basal cell and squamous cell epitheliomas of the nose and ear, wide surgical excision with immediate skin grafting should always be given primary consideration.

A series of 24 cases of carcinoma of the nose and ear is reported in which this method of treatment was employed. There

were no recurrences, and the cosmetic results were excellent.

RÉSUMÉ

L'exposition directe aux rayons solaires riches en rayons ultra-violet est un facteur prédominant dans l'origine du carcinome de la peau chez les personnes appartenant à certaines familles raciales. Plus la peau est claire et fine, plus grands sont les risques de cancer cutané si l'exposition est poursuivie pendant un temps assez long.

L'irradiation devrait être utilisée avec extrême prudence, et seulement par des radiologistes qualifiés, dans le traitement des lésions cancéreuses du nez et de l'oreille.

Dans le traitement des épithéliomes cellulaires basaux et squameux précoces du nez et de l'oreille, il faudrait toujours envisager en premier lieu une large excision chirurgicale, avec greffe épidermique immédiate.

L'auteur rapporte une série de 24 cas de carcinome du nez et de l'oreille dans lesquels il a eu recours à cette méthode. Il n'a eu aucune récurrence, et les résultats cosmétiques ont été excellents.

ZUSAMMENFASSUNG

Bei Menschen gewisser rassischer Herkunft spielt das direkte Ausgesetztsein dem Einfluss der Sonnenstrahlen von hoher ultravioletter Intensität eine hervorragende Rolle in der Entstehung des Hautkrebses. Je heller und dünner die Haut umso grösser ist die Wahrscheinlichkeit der Entwicklung eines Hautkrebses, wenn die Exposition über einen genügend langen Zeitraum ausgedehnt wird.

Beit der Behandlung von Krebsen der Nase und des Ohres sollten Bestrahlungen mit äusserster Vorsicht und nur von hochqualifizierten Radiologen angewandt werden.

diseases, and a large "normal" group of the remainder. Particulars of the abnormalities in the first four groups are given in tables II to V

TABLE XV

Ages 21 and over

"Normals" + endocrine abnormalities—constants and correlation coefficients

Parathyroid	Males				Females			
	No	Mean in mg	Standard deviation	Coefficient of variation	No	Mean in mg	Standard deviation	Coefficient of variation
Right upper	145	26.03 ± 1.02	12.32	47.34	100	31.55 ± 1.65	16.54	52.43
Right lower	145	33.03 ± 1.21	14.52	43.96	100	38.10 ± 1.87	18.65	48.90
Left lower	145	35.00 ± 1.44	17.28	49.38	100	40.20 ± 2.11	21.10	52.49
Left upper	145	26.69 ± 1.30	15.69	58.79	100	32.45 ± 1.73	17.26	53.19

Parathyroid.	Males	Females
Right upper and right lower	4234 ± 068	1965 ± 096
Right upper and left lower	6005 ± 053	3057 ± 091
Right upper and left upper	7161 ± 040	3579 ± 087
Right lower and left lower	5424 ± 059	3221 ± 090
Right lower and left upper	4383 ± 067	2440 ± 094
Left lower and left upper	6409 ± 049	3871 ± 085

(2) These groups were analysed and compared. The endocrine group differs from the "normal" group in two ways. First, both parathyroid and parenchyma are significantly greater in adult females than in adult males in the endocrine group but not in the "normal". Secondly the parathyroid but not the parenchyma is significantly greater in females of the endocrine group than in females in the "normal" group. No explanation could be found of these differences.

(3) The two renal groups contain relatively numerous examples of unusually large glands showing histological evidence of abnormal activity. The endocrine group contains one (4 glands) associated with acromegaly and another (3 glands) associated with excessive resorption of bone. To obtain the weights of histologically normal glands the adults with four or more glands in the "normal," bone abnormalities, and endocrine groups, excepting the case of acromegaly, were, therefore, examined as a series of 191 males and 130 females.

(4) In this histologically normal series the weights of the whole glands range from 3 mg in an infant of 6 hours to 388 mg in a man of 45 years. The glands of two adult males weigh 308 and 388 mg respectively, the parenchyma in the former weighs 187 mg and in a third male 189 mg. With these exceptions the weights

ders Company, 1955, 7th ed., p. 625.

4. Hall, A. F.: Relationships of Sunlight, Complexion and Heredity to Skin Carcinogenesis, *Arch. Dermat. & Syph.* 61:589-610 (April) 1950.

5. Molesworth, E. H.: Rodent Ulcer, *M. J. Australia* 1:878-899 (June 18) 1927; *Urol. & Cutan. Rev.* 31:543-564 (Sept.) 1927. Cited by Hall.⁴

6. Philpott, O. S.; Woodburne, A. R., and Philpott, J. A. Jr.: Skin Cancer and Sunlight, *Rocky Mountain M. J.* 51:610-611 (July) 1954.

7. Phillips, C.: Observations Based Upon the Study of 1,434 Skin Cancers, *Virginia M. Monthly* 67:400-406 (July) 1940.

8. Schrek, R.: Cutaneous Carcinoma; Analysis of Twenty Cases in Negroes, *Cancer Research* 4: 119-127 (Feb.) 1944.

9. Howles, J. K.: Epithelioma of the Skin and Oral Mucous Membranes, *South. M. J.* 28:494-503 (June) 1935.

10. Findlay, G. M.: Ultra-Violet Light and Skin Cancer, *Lancet* 2:1070-1073 (Nov. 24) 1928. Cited

by Hall.⁴

11. Ward, G. E., and Hendrick, J. W.: Malignant Epithelial Tumors of the Skin of Head and Neck, *Am. J. Surg.* 79:771-786 (June) 1950.

12. Postlethwait, R. W.: Carcinoma of the Skin, *J. South Carolina M. A.* 47:69-71 (Feb.) 1951.

13. Andrews, G. A.: Early Diagnosis of Cancer of the Skin, *Arch. Dermat. & Syph.* 53:570-572 (June) 1946.

14. Broders, A. C.: Squamous-Cell Epithelioma of the Skin: A Study of 256 Cases, *Ann. Surg.* 73:141-160 (Feb.) 1921.

15. Gates, O., and Warren, S.: The Grading of Epidermoid Carcinoma, *Surg., Gynec. & Obst.* 58: 962-967 (June) 1934.

16. Miller, D.: Cancer of the External Auditory Meatus, *Laryngoscope* 65:448-461 (June) 1955.

17. Pack, G. T.: Treatment of Cutaneous Epithelioma, *Arch. Dermat. & Syph.* 53:576-585 (June) 1946.

In April 1922, six months before Halsted's death and thirty-seven years after the discovery of nerve-blocking, Halsted was tendered a public banquet by the American National Dental Association and presented with a gold medal. He was much touched by this spontaneous and generous, though belated, tribute. He wrote to a friend: "The celebration was a success. I am so thankful to have lived to take part in it. Not a wink of sleep did I get during the night of Saturday. I was too exhilarated for repose. Once before in my life I was kept awake by a great happiness; this was the night that I passed successfully the examination for Bellevue Hospital, in 1876." What an interesting, frank, almost naïve letter for a man of seventy, already a member of a great many learned societies and an acknowledged world-renowned master, who was so pleased by the tribute to a discovery he made when a young man of thirty-three!

Halsted, after making this remarkable discovery, made no attempt to capitalize on it or to "get himself before the public," as many lesser surgical lights succeed so well in doing. There were too many unsolved surgical problems he was too busy with.

—Major

in adult males lie within the limits of 263 mg for the glands and 174 mg for parenchyma. In one adult female the glands weigh 314 mg. With this exception the weights in adult females lie within the limits of 295 mg for the glands and 193 mg for parenchyma. The odds against the occurrence of the higher weights have been calculated on the assumption of a normal distribution.

(5) The weight of the glands attains its maximum in males between 21 and 30 years, and after a slight fall remains more or less constant. In females there is a progressive rise till about the age of 50. At 5 years and over the glands are heavier in females, below 5 years they are slightly heavier in males.

(6) The mean percentage volume of parenchyma shows a slight decline with age, which is greater in females than males. In adults the mean percentage volume of fat in the interstitial tissue is slightly greater in females than in males.

(7) Comparison of the weights of individual glands showed that the two lower are heavier than the two upper, and the order of increasing weight is right upper, left upper, right lower, left lower. The inter-correlation between the weights of the four glands is higher in males than in females.

(8) The weights of the glands and of their parenchyma were correlated with that of the body, with the length and other variables. The weights of individual glands were also correlated with these variables. In cases under 21 a partial correlation, keeping age constant, was carried out. The means, standard deviation and correlation coefficients are given in tables XI to XIV and XVI. Significant correlations are mentioned in the text.

(9) Where only 2 or 3 glands were found their relatively small weight suggests that all glands had not been found.

We are indebted to Professor Major Greenwood for supervising the statistical analysis and to Professor Hubert M. Turnbull for originating the research and collaborating in the preparation of the paper.

REFERENCES

- | | |
|------------------------------------|--|
| AIBARA, G | <i>Trans Jap Path Soc</i> , 1931, xxi 188 |
| DANISCH, F | <i>Frankfurt Z Path</i> , 1924, xxx 443 |
| FREEMAN, W | <i>Human Biology</i> , 1934, vi 489 |
| MARINE, D | <i>In Cowdry's Special cytology</i> , New York, 1928, i 577 |
| PAPPENHEIMER, A M, AND WILENS, S L | <i>Amer J Path</i> , 1935, vi 73 |
| RUSSELL, D S | Medical Research Council, Special report series, no 142, London, 1929, p 161 |
| WELSH, D A | <i>J Anat and Physiol</i> , 1897 98, xxxii 380 |

the world literature, and in 1950 Rienhoff collected 597 cases. Probably, by this time, 1,000 patients have been operated on. Many of these cases are extremely interesting, for various reasons; here, however, I shall mention only the cases described by Anderson and Schlesinger, Simpson and Wilson, Smith and Goldman, Manzani, Gutman and Parsons, Black, Ben-Asher, Lievre, Zuckschwerdt, Hellström and others.

Clinically the skeletal manifestations usually held the foreground, although they were frequently accompanied by calculi of the urogenital tract. Gastrointestinal symptoms were rare.

For the surgeon at that time the main problem was the abnormal location of the parathyroid tumors, which could be palpated before operation only in extremely rare cases. When on exposure of the parathyroid region the tumor was not immediately found, a systematic search had to be instituted. Pathologic sites were preponderantly in the anterior portion of the mediastinum, more rarely in the posterior portion. This atypical location of parathyroid tumor is no longer a rarity, and since, as Paolucci pointed out, 25 per cent of such tumors are situated atypically, one must plan one's operations according to these facts.

In 1933 I published an account of my technical procedure if, in operating for primary hyperparathyroidism, no typically situated parathyroid tumors are present. In these circumstances one must look (1) inside the thyroid gland; (2) in the anterior portion of the mediastinum; (3) in the retrotracheal area, and (4) in the posterior portion of the mediastinum.

My last two operative cases, reported in *Schweizerische Medizinische Wochenschrift* in 1956, in an issue published in honor of the birthday of Prof. Jentzer, were cases of osseous hyperparathyroidism. In 1 case this was deep in the an-

terior portion of the mediastinum; and in the other, in which an operation was successful after two unsuccessful attempts by another surgeon, it was situated near the pericardium in the anterior portion of the mediastinum.

At that time, the fact that occasionally no tumor could be detected provoked unjustified criticism and doubts as to the usefulness of the operation, which occasionally had to be followed by a second or third operation that was sometimes successful. Another consequence of failure to detect a tumor was the effort made to secure satisfactory results by removal of normal parathyroid tissue. Today it is generally known that this procedure is useless and that the operation cannot be carried to a successful end. Indeed, the reasonless extirpation of normal parathyroid tissue may, in case a second operation becomes necessary, give rise to a serious tetany (Snapper).

One of the most interesting proposals for locating a hidden tumor of the parathyroid is that of Seldinger, who suggested arterographic study of the carotid artery, since in most cases a branch of the inferior thyroid artery is directed towards the aberrant parathyroid tumor.

In my experience, to try to remove healthy parathyroid tissue in the presence of disease not physiologically connected with the parathyroid glands is useless. Such proposals were made by Leriche and his school for Bechterew's disease, scleroderma, in Dupuytren's disease and some other conditions.

So far only technical questions have been touched upon, which may now, at least to a certain extent, be regarded as solved.

A second serious problem for the surgeon is to prevent tetany after extirpation of the parathyroid tumor. In my experience, the extent of osseous change has nothing to do with the d

are malignant adenomata, composed of anaplastic cells and presenting that unequivocal criterion of malignancy, the invasion of the capsule or of blood vessels

The twenty-five malignant tumours here examined include four distinct types (table II)

TABLE II

Malignant tumours of the thyroid gland recorded in this paper

Type	No of cases	Sex.		History of previous goitre	Cases exhibiting thyrotoxicosis	Results	
		M	F			Well	Dead.
1 Papillary adenocarcinoma							
A Low malignancy	2	0	2	2	0	2 (2)	0
B Moderate malignancy	5	0	5	3	0	4 (2)	1*
2 Carcinoma simplex	4	1	3	2	1	4	0
3 Malignant adenoma	13	2	11	13	1	11 (5)	2†
4 Sarcoma	1	0	1	0	0	1 (1)	0

* Invasion of left internal jugular vein Died eight days after operation

† (1) Died a few hours after operation

(2) Died seven months after operation Multiple metastases

Figures in brackets indicate number of cases under observation for less than one year

PAPILLARY ADENOCARCINOMA

Two cases (A) in this group are histologically of low malignancy and correspond to the sub-group papillary adenocytoma of Smith, Pool and Olcott In both of them an adenomatous origin is probable Microscopically (fig 1), the tumours are composed of alveoli in which there are many papillary processes of cubical or columnar cells, and in some areas these processes are enclosed in cystic spaces bounded by bands of hyaline connective tissue A little colloid is present In one case, the limiting ring of connective tissue is infiltrated in some parts by the tumour cells and in some fields the papillary structure is replaced by a carcinoma simplex arrangement Still the general appearance remains that of a papilliferous adenocarcinoma of low malignancy

The other five cases of this group (B) appear more malignant They are composed of intracystic papilliferous growth, but in some areas the processes are formed by two or more layers of polyhedral cells with large active nuclei and in one case a small focus of squamous metaplasia is to be seen (fig 2) Infiltration of the perivascular lymphatics is present in two of these cases In the most malignant case there is a friable growth which extends through the capsule of the gland and invades the left internal jugular vein, a portion of this tumour (removed at operation after much difficulty) presents, microscopically, a variable structure and

of purely renal over osseous manifestations. In 1935, the number of reported cases of this type had grown to 6 (Cope); by 1936 to 18. Eventually, in 1944, Cope reported that an overwhelming majority of his 78 cases belonged to the renal type, and cases of the osseous type were thus heavily outnumbered. The recognition of diffuse hypertrophy of parathyroid tissue required a new operative method, since the object of surgical intervention was no longer to remove either a normally or an abnormally situated adenoma but to "reduce" the parathyroid tissue (Cope).

Although the opposition to Erdheim's theory, based on the fact that compensatory hypertrophy of only one of the organs is scarcely conceivable, was to a certain extent shaken by this new discovery, there can be no doubt that here too, as in the case of adenoma, the hyperplasia is primary, because "reduction of parathyroid tissue" results in recovery.

Thus far only the Boston group of investigators had reported these observations. After Keating of the Mayo Clinic had visited Boston in order to study the new methods of examination, however, he discovered 24 cases of hyperparathyroidism during a period of two and one-half years, while in the preceding fourteen years there had been no more than 14 cases in all (Alexander, Pemberton, Kepler and Broders). In the Mayo Clinic he observed a large number of patients with hyperparathyroidism among those with renal lithiasis; and the renal type, in actual fact, outnumbered the osseous type.

Here the diagnosis of hyperparathyroidism had been established on the strength of repeated biochemical examination, and it was the Sulkovitch test—that simple and inexpensive test method for hypercalcaemia—that had given the first hint of a derangement in calcium metabolism.

There is still a marked difference, however, between the results obtained by the

Boston group and those obtained at the Mayo Clinic. Not one of Keating and Cook's patients, although these authors also noted a preponderance of the renal type, presented diffuse hyperplasia of the entire parathyroid tissue that had been so frequently reported by the Boston group. All of them, however, had adenomas.

The renal type of primary hyperparathyroidism is not necessarily, therefore, connected with diffuse hyperplasia of the parathyroid tissue, but its pathologic expression may also consist of isolated adenomas, as with the osseous type of primary hyperparathyroidism. This is not to exclude the fact that in the cases of diffuse enlargement of all the parathyroid glands, observed especially by the Boston investigators, a special and new entity of primary hyperthyroidism was presented. For a long time, of course, I also have examined all patients with lithiasis at my disposal. From the beginning of my studies on hyperparathyroidism I was interested in the relation between renal calculus, osseous changes and parathyroid tissue. As early as 1933 I published, in collaboration with Ubelhör, an experimental paper showing that, by injections of parathormone into guinea pigs with congestion of the urinary bladder, one may produce stones in the kidney. In nearly all experimental animals the calcification in the kidney can be produced in about four weeks.

In patients the results of my search for clear cases of renal hyperparathyroidism were poor. In only 1 case, at the place of my former work, was the condition observed at autopsy (parathyroid adenoma of the clear-cut renal type). During the past year in Vienna, at one of the most frequented urologic stations, only two clear cases of the renal type could be discovered; after removal of the parathyroid adenoma it was found that

are malignant adenomata, composed of anaplastic cells and presenting that unequivocal criterion of malignancy, the invasion of the capsule or of blood vessels

The twenty-five malignant tumours here examined include four distinct types (table II)

TABLE II

Malignant tumours of the thyroid gland recorded in this paper

Type	No of cases	Sex		History of previous goitre	Cases exhibiting thyrotoxicosis	Results	
		M	F			Well	Dead
1 Papillary adenocarcinoma							
A Low malignancy	2	0	2	2	0	2 (2)	0
B Moderate malignancy	5	0	5	3	0	4 (2)	1*
2 Carcinoma simplex	4	1	3	2	1	4	0
3 Malignant adenoma	13	2	11	13	1	11 (5)	2†
4 Sarcoma	1	0	1	0	0	1 (1)	0

* Invasion of left internal jugular vein Died eight days after operation.

† (1) Died a few hours after operation

(2) Died seven months after operation Multiple metastases

Figures in brackets indicate number of cases under observation for less than one year

PAPILLARY ADENOCARCINOMA

Two cases (A) in this group are histologically of low malignancy and correspond to the sub-group papillary adenocytoma of Smith, Pool and Olcott. In both of them an adenomatous origin is probable. Microscopically (fig 1), the tumours are composed of alveoli in which there are many papillary processes of cubical or columnar cells, and in some areas these processes are enclosed in cystic spaces bounded by bands of hyaline connective tissue. A little colloid is present. In one case, the limiting ring of connective tissue is infiltrated in some parts by the tumour cells and in some fields the papillary structure is replaced by a carcinoma simplex arrangement. Still the general appearance remains that of a papilliferous adenocarcinoma of low malignancy.

The other five cases of this group (B) appear more malignant. They are composed of intracystic papilliferous growth, but in some areas the processes are formed by two or more layers of polyhedral cells with large active nuclei and in one case a small focus of squamous metaplasia is to be seen (fig 2). Infiltration of the perivascular lymphatics is present in two of these cases. In the most malignant case there is a friable growth which extends through the capsule of the gland and invades the left internal jugular vein, a portion of this tumour (removed at operation after much difficulty) presents, microscopically, a variable structure and

roid adenoma, on the other, thus seem to be explained in general:

There exists a primary and a secondary type of hyperparathyroidism, fairly well delineated, between which, in case there are no overlapping biochemical manifestations and unless the two types are combined, it is readily possible to discern the difference.

Apart from the aforementioned clinical types of primary and secondary hyperparathyroidism, it must be emphasized that the most frequent type of hyperparathyroidism is the chronic progressive type, starting in the bones or in the kidneys and sometimes affecting the gastrointestinal tract.

Apart from the most common type, there are two extremes: first, the "silent" type of hyperthyroidism observed in most cases, until now described only at autopsy (Lievre, Keynes, Barker and Brines), and second, a rapid and dramatic progressive form of hyperparathyroidism that merges into the "toxic" form. It develops with cachexia, and most patients succumb in a few weeks or months to cachexia or renal insufficiency. Such cases have been described by Wanke, Alexander, Pemberton, Kepler and Broders, McClure and Lamm. I have observed 1 case of this type.

The question of *malignant* tumors of the parathyroids should also be touched upon. I have never encountered one. The latest reports (1953) come from Cope and Castleman, who collected 65 cases from the world literature. If these are more closely scrutinized, however, according to Stephenson, in only 10 cases were *real signs* of malignancy present. My own opinion is that malignant tumors of the parathyroids are extremely rare.

The indications for parathyroidectomy are fairly clear when one is dealing with primary hyperparathyroidism. Although some other disorders present similar clinical and roentgenographic aspects, they

do not present the characteristic chemical picture of primary hyperparathyroidism. This applies particularly to "nongeneralized fibrous osteodystrophy"—a term descriptive of the various types originally referred to as "osteitis fibrosa localisata," etc., which may involve either several bones or extensive portions of bone. In none of these cases were the chemical data identical with those observed in cases of primary hyperparathyroidism, and in no instance was a parathyroid adenoma detected (Mandl).

Such cases are interesting in another direction, especially with regard to the differential diagnosis of malignant tumors.

Paget's disease—up to the year 1926 still identified with Recklinghausen's disease—has now once and for all been distinguished from primary hyperparathyroidism for similar reasons, even though occasionally a "pagetoid" roentgen appearance may be encountered in this area.

Of late, much attention is being given to a certain disorder, the nature of which is absolutely unclarified, but which was originally considered to bear some relation to hyperparathyroidism. This is the so-called "Albright Syndrome" (1937), also referred to as "polycystic fibrous dysplasia with pigmentation of the skin associated with pubertas praecox in females" (Lichtenstein-Snapper). I had the opportunity to observe one of the first cases of this type with Borak and Doll in 1934. Even then I looked for a parathyroid adenoma and expressed my opinion that this was a separate entity and had nothing in common with hyperparathyroidism. Since Albright published his report, quite a number of such cases have been described (Doekerty and his co-workers; Mondor and his associates; Robson and Todd; Summerfeldt; Neller; Sternberg and Joseph). A total of more than 100 cases has thus far been studied (Doekerty and Jaffe), in approximately

aspectos da questão exigem e justificam novas pesquisas. Em nenhum caso de tumor paratiereideo a operação que eu divulguei trouxe ainda uma solução completa no parecer dos cirurgiões de glandulas internas contra uma molestia endócrina mortal.

RESUMEN

Parece que hoy, treinta años después de que la primera paratiroidectomía fué efectuada con éxito para el tratamiento del hiperparatiroidismo primario, muchas preguntas están todavía en un estado de poca claridad ya que este campo de investigación no ha perdido aún su importancia.

Pero en todo caso, la operación para tumor paratiereideo, que yo introduje, ya está dando verdaderos resultados a cimientos endocrinológica mortal.

BIBLIOGRAPHY

- Albright, F.; Bloomberg, E.; Castleman, B., and Churchill, E. D.: Arch. Int. Med. 54:315, 1935.
 Albright, F.; Sulkowitch, H. W., and Bloomberg, E.: Am. J. Med. Sci. 193:800, 1937.
 Albright, F.; Sulkowitch, H. W., and Bloomberg, E.: Arch. Int. Med. 62:199, 1938.
 Alexander, H. B.; Pemberton, J.; Kepler, E. J., and Broders, A. C.: Am. J. Surg. 65:157, 1944.
 Andersen, D. H., and Schlesinger, E. R.: Am. J. Dis. Children 63:102, 1942.
 Barker, V. L., and Brines, O. A.: Arch. Surg. 39:205, 1939.
 Ben-Asher, S.: J. Lab. & Clin. Med. 24:709, 1939.
 Black, B. M.: Surg., Gynec. & Obst. 87:172, 1948.
 Borak, J., and Doll, B.: Wien. klin. Wchschr. 47:540, 1934.
 Churchill, E. D., and Cope, O.: Surg., Gynec. & Obst. 58:256, 1934.
 Cope, O.: Surgery 16:273, 1944.
 Cope, O.: Ann. Surg. 114:4, 1941.
 Cope, O., and Castleman, B.: Ann. Surg. 138:661, 1953.
 Coryn, G. I.: J. de chir. Belge 33:213, 1934.
 Dockerty, M. B.; Ghormley, R. K.; Kennedy, R. L. J., and Pugh, D. C.: Arch. Int. Med. 75:357, 1954.
 Eger, W.: Acta med. Nordmark 7:11, 1955.
 Erdheim, J.: Wien. klin. Wchschr. 41:1544, 1928.
 Gutman, A. B., and Barklay Parsons, W.: Ann. Int. Med. 12:1, 1938.
 Hellner, H.: Arch. klin. Chir. 198:243, 1940.
 Hellström, I.: Acta chir. Scand. 100:391, 1950.
 Himmelmann: Zentrbl. f. Chir. 43:258, 1935.
 Jaffe, H. L.: J. Mt. Sinai Hosp. 12:364, 1945.
 Karcher, H.: Arch. klin. Chir. 264:590, 1949.
 Keating, F. H., and Cook, E. N.: J.A.M.A. 129:994, 1945.
 Keynes, G.: Brit. J. Surg. 24:403, 1936.
 Leriche, R.: Soc. internat. de chir. (Paris) X Congress, 1935.
 Lichtenstein, F., and Jaffe, H. L.: Arch. Path. 33:777, 1942.
 Ljeve, I. A.: L'ostéose parathyroïdienne. Paris: Masson et Cie, 1932. Mem. Soc. Med. Hôp. de Paris 7:132, 1947.
 Mandl, F.: Zentrbl. f. Chir. 53:260, 1926.
 Mandl, F.: Arch. klin. Chir. 143:1, 1926.
 Mandl, F.: Deutsche. Z. Chir. 240:362, 1933.
 Mandl, F., and Uebelhör, R.: Zentrbl. f. Chir. 60:68, 1933.
 Mandl, F.: Surgery 21:394, 1947.
 Mandl, F.: Schweiz. med. Wchschr. Suppl. 20, 1956.
 Mandl, F.: Wien. Ztschr. f. Int. Med. 3:101, 1948.
 McCallum, W. G., and Voegtlin, C.: J. Exper. Med. 5:118, 1909.
 McClure, R. D., and Lam, C. R.: Ann. Surg. 121:454, 1945.
 Meuser, H., and Kreitner, H.: Z. Urol. 43:1, 1950.
 Nickels, J.: Arch. klin. Chir. 205:488, 1944.
 Norris, E. H.: Surg., Gynec. & Obst. 84:1, 1947.
 Oehlecker, F.: Chirurgische Knochen- und Gelenkerkrankungen. Berlin, Göttingen, Heidelberg: J. Springer Verlag, 1933.
 Oehlecker, F.: Chirurgie 23:272, 1952.
 Paolucci, R.: J. Internat. de Chir. 9:209, 1949.
 Redwitz, F.: Zentrbl. f. Chir. 52, 1937.
 Rienhoff, W. F.: Ann. Surg. 131:917, 1950.
 Seldinger, S. I.: Acta Radiol. Stockholm 42:353, 1954.
 Snapper, I.: Medical Clinic on Bone Diseases. New York: Interscience Publishers, 1943.
 Snapper, I., and Boere, H. I.: Arch. klin. Chir. 170:371, 1931.
 Stephenson, H. U.: Arch. Surg. 60:247, 1950.
 Uehlinger, E.: Wien. klin. Wchschr. 61:417, 1949.
 Wanke, R.: Deutsche Zschr. f. Chir. 228:210, 1930.

Eck was convinced that the few surviving dogs were free of pathologic change and therefore that the fistula would have the same effect in man when created in cases of ascites. Pavlov, as has been stated, was unable to confirm Eck's observation. A number of his dogs showed severe toxic symptoms after the operation. Instinctively they refused to eat meat, and they exhibited signs of depression and suffered from convulsions, ataxia, catalepsy and, occasionally, blindness. These observations were confirmed by others. A satisfactory explanation of this syndrome, however, could not be given, in spite of heated controversy on the subject. In 1949, Markowitz¹¹ of the Mayo Clinic reported that dogs with Eck's fistula appeared to be in comparatively good condition as long as meat was omitted from their diet. After about eight weeks, pronounced atrophy of the liver was observed, the organ shrinking to one-third its normal size.

In certain species of monkeys (*Macaca mulatta*) the creation of Eck's fistula was followed by the development of a new collateral circulation between the ligated portal vein and the liver. As a result, normal conditions of the organism returned spontaneously. The monkeys instinctively refused meat. The collaterals were established within a few weeks. This syndrome can be interpreted without difficulty. Once the collateral circulation has developed via the preexisting and newly formed portohepatic veins, the intestinal tract and its accessory glands drain again into the liver, where the toxic proteins derived from food, i.e., the breakdown products of meat, can be assimilated.

Subsequent to the ligation of the portal vein, portal hypertension develops, leading to dilatation of the preexisting collaterals. Before the formation of new collaterals is

complete, toxic proteins may invade the systemic circulation, leading to toxemia and death due to hepatic coma.

It is a known fact that the fetal liver does not function and that the placenta acts as the main metabolic organ. The organism has solved this problem in such a miraculous way that all substances indispensable for function and growth are assimilated by the maternal organism and supplied direct to the general circulation of the fetus, bypassing the liver via the ductus venosus Arantii. Post partum this duct becomes obliterated, because the placenta is no longer present and because the infant's liver starts functioning (though within limits).

When an Eck's fistula operation is performed on an adult human being or an experimental animal, circulatory conditions partially duplicating fetal conditions are established without a placenta. The subsequent toxemia shows plainly that such an operation is physiologically unsound and therefore useless. My interpretation of these experiments elucidates the contradictions and explains the fatal outcome that must be expected unless the organism can restore normal conditions in time and thus make amends, in nature's remarkable way, for the senselessness of these experiments.

Dilatation of the splanchnic vessels and the severe congestion and hypertension of the portal vein associated with cirrhosis of the liver have been studied, especially by the French school. The slow development of hepatic cirrhosis is accompanied by signs of toxic conditions due to the toxic proteins which, according to the degree of cirrhosis, are flooding the general circulation and will continue to do so until the patient succumbs to hepatic coma. Himsworth,¹² in 1947, described a

11. Markowitz, J.: *Experimental Surgery*. Baltimore: The Williams and Wilkins Company, 1949.

12. Himsworth, H. P.: *Derangement of the Hepatic Circulation in Disease*, Tr. 6th Congress Josiah Macy Foundation, 1943; *Liver In.* 73.

Portal hypertension may also develop suddenly, for instance, after ligation of the portal or hepatic vein. If the pressure increases slowly, only certain portal roots become obstructed and dilated. The flooding of the mucous membranes of the abdominal organs or of parts of the intestinal tract produces a large variety of syndromes, pathographically described as specific organic diseases. Their genesis, however, has never been explained. No wonder the cause of these fictitious diseases has never been disclosed.

Since portal hypertension may be intermittent, it may also disappear. Since destruction of the liver cells may be followed by regeneration, several clinical syndromes may improve.

Shell,¹⁴ in 1931, reported the close relation existing between insufficiency of the liver and the accompanying syndromes. Ten per cent of his cirrhotic patients had gastric or duodenal ulcers. According to Blond and Haler,⁴ all ulcers of the intestinal tract, including those of the esophagus and the rectum, are signs of intermittent portal hypertension. The known intermittent hemorrhages from esophageal and rectal varicosities are signs of portal back-pressure, depending on the actual degree of hepatic insufficiency. Alterations of the portal back-pressure may occur physiologically, e.g., at the height of the digestive process or during defecation in the majority of cases. The most frequent signs of portal hypertension are hemorrhoids and their complications; it must, therefore, be a matter of surprise that textbooks still maintain their cause to be unknown, most probably because it is too difficult to grasp the causation of dynamic processes on the basis of pathographic descriptions. With my interpretation in mind, I cannot admit a different causation for esophageal, gastric, duodenal and rectal ulcers. Colitis ulcerosa

is also due to portal backflow into the colon; that the clinical picture differs has to do only with the local intestinal flora.

Child, in 1954, stated as a result of his animal experiments: "When the obstruction to the portal flow lies outside the liver, numerous anastomotic channels develop in the immediate vicinity of the occluded portal or splenic veins. These partially circumvent the block, and portal blood gains access to the liver almost directly. The components of this type of collateral circulation are the deep cystic veins of the gall bladder, the epiploic veins of the gastric omentum, the hepatocolic and the hepatorenal veins and the accessory veins of Sappey." There are, in addition, a great number of portacaval shunts (cf. Blond and Haler, Fig. 4). Child also affirmed that, after ligation of the portal vein or after Eck's shunt operation, either in man or in the experimental animals, *survival is possible only if new portohepatic collaterals are formed that restore the portohepatic circulation*. This interpretation appears to prove that the portal blood contains toxic proteins—that is, the true carcinogenic substances, according to my interpretation. Anemia, leukopenia and thrombocytopenia belong to the syndrome of portal hypertension. It is known that after splenectomy the blood picture changes; therefore the spleen has been made responsible for the abnormal blood picture, though no explanation of its mechanism has been offered. Splenomegaly also belongs to the syndrome of portal hypertension. The supposed hyperfunction of the spleen is termed "hypersplenism," a term that explains neither the cause of the disorder nor the late effects of splenectomy. I have already pointed out that enlargement of the spleen is a sign of hepatic insufficiency and of portal backflow. Toxic proteins, when flooding the spleen, may also reach the hemopoietic or ans vi lat-

14. Snell, A. M.: Ann. Int. Med. 5:338, 1931.

the disappearance of esophageal varicosities, he does not consider this a proof of the operation's success. Varicosities of the esophagus may also disappear spontaneously, a phenomenon which the author correctly ascribes to changes in the liver. This observation is in agreement with my conclusion that portal hypertension may take an intermittent course.

According to Child, even today it is not quite understood why water and electrolytes should be excreted by some cirrhotic patients and not by others, or why severe postoperative ascites develops in some patients with a certain degree of cirrhosis, whereas in others, apparently with an equal degree of damage to the liver, this does not occur. This problem also could be answered by my hypothesis. The degree of damage to the liver represents, as has been repeatedly stated, a quantitative dynamic problem. Child himself mentioned an "apparent" equal degree of hepatic damage. Preexisting portacaval collaterals vary. The very moment portal hypertension sets in, dilation of the collaterals occurs. It depends, therefore, on the individual anatomic variations that prevail in the patient whether, after ligation of the portal vein, the number of collaterals will be sufficient to insure the passage of a certain amount of portal blood through the liver. Experimental dogs, as well as patients, owe their survival after the shunt operation only to the presence and the sufficient dilation of the collaterals. The ingenuity of the organism surpasses that of the experimenters.

Anuria following Eck's shunt operation may be explained by the flooding of the kidneys with toxic proteins via the plexus of Retzius. Also, the effect of renal decapsulation is a result of the interruption of communications between the renal capsule and the portal system, normally sustained by means of these portarenal anastomoses. Until recently surgical intervention was

considered contraindicated for a cirrhotic patient. Our medical ancestors knew that in such cases operation leads to oliguria and ascites and that the outcome is fatal.

Further support for my reasoning is found in another observation reported by Child: patients with a serum albumin level below 3 Gm. per hundred milliliters were found to be bad risks for shunt operations. Child tried, therefore, to raise the serum albumin level to 3.5 or 4 Gm. per hundred milliliters by transfusion of human blood plasma. In other words: In the cirrhotic patient, as a result of portal backflow and damage to the liver, the serum albumin level is extremely low. Transfusion of normal human plasma is required to make such a patient fit for surgical intervention. The damaged liver is incapable of supplying the body with sufficient amounts of assimilated proteins. The polypeptides derived from food accumulate in the portal veins, chronically irritating the mucous membranes of the intestinal tract and its accessory glands until, ultimately, they induce neoplastic degeneration and merely provide the nourishment for malignant growth.

Having investigated the conditions arising after ligation of the portal vein, Child distinguished three phases of adaptation in the splanchnic vessels in response to the changed portohepatic circulatory conditions. After the portal vein has been ligated, its blood immediately returns via pelvic collaterals. During portal hypertension this condition persists for some time. At the end of a period varying from about one week to two months after the operation, a large number of collaterals develop in the immediate vicinity of the ligation. Two to six months later, confluence of many of these collateral vessels can be noted, and after fully four to six months one or two of these collaterals may succeed in compensating for the

throughout the tumour in close association with the cells (fig 9) Chromatin debris is prominent in many areas, mitoses are very infrequent

The remaining gland is composed of acini of normal appearance but contains numerous large foci of lymphadenoid tissue, the lymphocytes in these foci are slightly smaller than the predominating tumour cell (fig 10)

MALIGNANT ADENOMA

The third type of malignant tumour of the thyroid, the malignant adenoma, is of special interest on account of the difficulty in diagnosis which it presents. The thirteen cases in this series have been carefully compared and contrasted with the twenty-four cases of single parenchymatous or "fœtal" adenoma.

The age incidence of the malignant adenoma group is 26 to 61 years, that of the parenchymatous adenoma 20 to 61 years. A history of previous goitres ranges from 4 to 30 years in the malignant adenomata and from three months to 30 years in the parenchymatous adenomata. Evidence of thyrotoxicosis was present in only one case of malignant adenoma while it was found in fourteen of the parenchymatous adenomata.

Morbid anatomy The naked eye appearance of these two conditions is very similar. Both are solid, apparently encapsuled tumours of yellowish colour on section with grey strands of fibrous tissue often radiating from the centre in a stellate fashion. Degenerative changes, hæmorrhagic, cystic and hyaline are present in varying amount. On the whole the adenomata which are more solid and yellow prove microscopically to be malignant, while the less solid forms with more advanced degenerative changes are found to be benign.

On *microscopic examination* the majority of malignant adenomata have a more varied and anaplastic structure than the benign, though in some of the latter, areas of atypical cells without alveolar arrangement or a papilliferous structure can be found.

The character of the blood vessels in these thirty-six cases has been examined with especial care and an attempt made to apply the criterion of malignancy brought forward by Graham (1924). From his study of these groups, including fifty-five malignant and forty-three benign adenomata, he concludes that a diagnosis of malignancy can be made on the morphology of cells and tissue in only 30 to 40 per cent, in the remaining 60 to 70 per cent malignancy can be neither affirmed nor excluded on such a basis. He considers that a diagnosis of malignant adenoma may safely rest on morphology in 60 to 70 per cent, but there still remains a proportion in which morphology cannot be relied on. He discusses invasion of blood vessels as evidence of malignancy and states that even

Medical and Surgical Aspects of Chronic Ulcerative Colitis: An Appraisal

THE purpose of this editorial is not to belittle or condemn standard methods of management of colitis but rather to emphasize what has seemed important in treatment, both medical and surgical, over a considerable period of years. Emphasis is placed on the psychogenic factors, the basic treatment program and the rejuvenation of an old but bolder concept of what goes into the surgical problem, with a reduction in the number of ileostomies. If one stops to consider the overall problem, it becomes obvious that the physician in charge must be father confessor, advisor and executive if the best management is to be carried out. In the hospital I serve, this has, by principle and practice, grown to be the exact state of affairs. Since the disease runs the entire gamut of medicine, it taxes the ingenuity of the shrewdest internist, the ever-observant psychiatrist and the most exacting surgical technician. Whenever possible these responsibilities should be combined in one person, the attending physician.

One often hears it remarked that the abdomen is the sounding-board of the emotions, since it is so well supplied with autonomic nerve fibers, of both the sympathetic and the parasympathetic system. The lines of communication between brain centers and the viscera and the behavior patterns of the gastrointestinal tract that have been utilized in infancy are carried to the brain and lodged there in that reservoir of memory, the subconscious mind. In

spite of the fact that the relation between psyche and soma is well known, it is surprising how little attention is given to this matter in the actual management of gastrointestinal disorders. Rarely is an evaluation made of the personality or the life situation of the patient. The physician may be too busy to try to work this out with the patient. Giving him a prescription for a digestive medicant is the path of least resistance. Even though he admits that there is a large "nervous element" present, he often looks upon this feature as secondary and probably a consequence of the physical disorder. He does not consider the psychic factors in illness on the same scientific level with gastric analyses, stool cultures or roentgen studies, and therefore he pays scant attention to them. He accepts psychogenesis only abstractly and with vague understanding of the nature of mental mechanisms and the part they play in illness. It was only a few years ago that psychiatrists impressed the profession with the fact that they proposed to cure chronic ulcerative colitis with psychotherapy alone, without the use of drugs. It was an interesting exercise but, like all branches of medicine, was self-limited.

If all the interested departments can be brought into the picture and integrated, there is no doubt that the patient will be benefited. It takes time and persistence to question the patient along the line of his mental processes. He may be sensitive and conclude that he is regarded as a weakling who "can't take it," or perhaps that he actually is a "mental case." The physician, not wishing to arouse ill will or antagonism, follows the traditional line of phys-

From the Ferguson-Droste-Ferguson Hospital, Grand Rapids.

Read at the Mid-Atlantic Division Regional Meeting of the United States and Canadian Sections, International College of Surgeons, White Sulphur Springs, Virginia, Feb. 10-12, 1957.

3 The importance of the relationship of the tumour cells to the endothelium of the smaller blood vessels in the diagnosis of malignant adenoma is emphasised

I am indebted to Mr C A Joll, F R C S , for permission to use the clinical records of the cases

REFERENCES

- | | |
|--------------------------|---|
| GRAHAM, A | <i>Surg , Gynec and Obstet</i> , 1924, \\\n 781 |
| " | <i>Arch Path</i> , 1933, \\\n 741 |
| HABERMEL, J F | <i>Amer J Surg</i> , 1934, \\\n 97 |
| PEMBERTON, J DE J | <i>Ann Surg</i> , 1928, \\\n 369 |
| SMITH, L W , POOL, E H , | <i>Amer J Cancer</i> , 1934, \\\n 1 |
| AND OLCOTT, C T | |
| SPEESE, J , AND BROWN, | <i>Ann Surg</i> , 1921, \\\n 684 |
| H P , Jr | |

baffling syndrome could be attributed, but most of the studies have been disappointing. All of us are aware of the accompanying mesenteric adenitis and the processes involved with perforation. Fistulas may occur, extending to the base of the mesentery, and then drain into the peritoneal cavity and cause peritonitis and all too frequently the patient's death. We are also well aware of the insidiousness and persistence of the staphylococcus and the streptococcus.

Nutritional anemia is always present. Iron deficiency is frequently present also, causing hypochromia and microcytic anemia. The deficiency may be due either to excessive loss of iron from the body, as in cases of chronic hemorrhage, or to an inadequate quantity of the element in the diet. This becomes a difficult replacement problem. I have come to look upon iron, given in almost any form, as a "filed-up tenpenny nail" that causes marked mechanical irritability and often excessive bleeding. I have had some success replacing iron with whole dark dried fruits, such as raisins, figs, dates, prunes or apricots.

Protein deficiency, though in itself a less common cause of anemia, is not infrequently a contributing factor, but replacement is fairly easy and satisfactory. Lack of vitamin C or certain factors of the B complex, such as riboflavin, nicotinic acid and folic acid, are important items. Five hundred mg. of vitamin C is given daily in most instances. Vitamin C is not stored; consequently, large doses are in order. Failure to utilize the specific antianemic factor may occur, though this appears to be rare. This type of anemia, of course, is treated as usual, and vitamin B12 seems to be definitely a necessity. The adrenal cortical steroids have been an extreme disappointment; in many instances in my own practice, they have been distinctly detrimental. Severe, hard-to-control hemor-

rhage has seemed to result from Cortisone therapy, though this is difficult to prove. ACTH in well regulated doses has been helpful, although the accompanying oversecretion of cortisone has produced some manifestations similar to those of adrenal cortical hypofunction. ACTH is much easier to use, though its influence on salt and water balance, alkalosis and neuropsychiatric reactions must be borne in mind. It is unquestionably extremely valuable in control of such remote manifestations as iritis and complications involving the skin and the joints.

The troublesome and insidious staphylococcus strains are usually sensitive to Tetracycline and Erythromycin.

One of the greatest disturbing factors in colitis in my own practice has been the use of milk in large quantities, particularly by the young. The great American habit of not weaning babies when they have acquired their teeth, has in a sense boomeranged upon us. Milk as a beverage is omitted from the hospital diet. Most of the patients we see are milk drinkers. The other animals, guided by nature's dictum, do not by any means follow man's direction. As soon as they get their teeth, the mother weans them, whereas we put our babies on cow's milk. If our human mothers had to provide the milk used by our milk drinkers, they would settle the question once for all; but that is another story and does not bear too much discussion. Suffice it to say that there are a great number of allergens present in milk that are not tolerated by the patient with colitis.

A record is maintained by the dietician indicating the type (usually high protein, acid ash), the amount and caloric value of the food intake and how it is tolerated. This becomes the patient's daily guide. His likes and dislikes are charted. Often im-

THE EFFECT OF COLCHICINE ON GROWTH OF MOUSE SARCOMA
S 37 *IN VIVO*

Mouse sarcoma S 37 of the Imperial Cancer Research Fund Laboratory was propagated in the customary manner by subcutaneous graft with a hollow needle. The mice were young adults of various sexes weighing eighteen to twenty grammes. Colchicine was obtained from British Drug Houses Ltd. It was easily soluble in distilled water in the concentration required. From it a stock solution was made up of strength 1 mg per c.c. and kept in the dark in a brown glass bottle. Appropriate dilutions for injection were made in Ringer's solution.

Three sets of experiments were carried out as follows —

(a) Twenty mice received 0.03 mg each of colchicine subcutaneously in the left flank and were grafted in the right flank immediately afterwards. Subsequently each received 0.01 mg every alternate day. Twenty controls were grafted at the same time from the same tumour but received no further treatment.

Result There was no significant difference between the number of successful "takes" or the rate of growth of tumours in the two series of animals. After two weeks the animals treated with colchicine were in poor condition presumably owing to the effects of the drug and there was subsequently some retardation of growth in them as compared with the controls.

(b) Twenty mice were grafted from a tumour-bearing animal which had received 0.01 mg of colchicine subcutaneously on 25th September 1935 and a further injection of 0.04 mg intravenously on 28th September 1935. One hour after the last injection the tumour was removed and twenty mice grafted from it. Twenty control mice were grafted from another tumour-bearing animal untreated with colchicine. Ten tissue cultures were also set up from each of the two tumours.

Result There was no appreciable difference between the number of "takes" in the experimental and control groups but there was a slight lag in the rate of growth of tumours derived from the colchicine-treated animal during the first week after their appearance. The end result in both groups was, however, similar.

Culture *in vitro* showed that 60 per cent of the explants from the colchicine-treated animal failed to grow and in the remainder, growth was only slight. Of the control explants 90 per cent grew vigorously.

(c) Twenty mice bearing tumours about 1 cm in diameter received 0.01 mg each of colchicine every alternate day. Twenty control animals bearing similar tumours remained untreated.

Result There was no significant difference between the rate of growth of tumours in the two groups.

baffling syndrome could be attributed, but most of the studies have been disappointing. All of us are aware of the accompanying mesenteric adenitis and the processes involved with perforation. Fistulas may occur, extending to the base of the mesentery, and then drain into the peritoneal cavity and cause peritonitis and all too frequently the patient's death. We are also well aware of the insidiousness and persistence of the staphylococcus and the streptococcus.

Nutritional anemia is always present. Iron deficiency is frequently present also, causing hypochromia and microcytic anemia. The deficiency may be due either to excessive loss of iron from the body, as in cases of chronic hemorrhage, or to an inadequate quantity of the element in the diet. This becomes a difficult replacement problem. I have come to look upon iron, given in almost any form, as a "filed-up tenpenny nail" that causes marked mechanical irritability and often excessive bleeding. I have had some success replacing iron with whole dark dried fruits, such as raisins, figs, dates, prunes or apricots.

Protein deficiency, though in itself a less common cause of anemia, is not infrequently a contributing factor, but replacement is fairly easy and satisfactory. Lack of vitamin C or certain factors of the B complex, such as riboflavin, nicotinic acid and folic acid, are important items. Five hundred mg. of vitamin C is given daily in most instances. Vitamin C is not stored; consequently, large doses are in order. Failure to utilize the specific antianemic factor may occur, though this appears to be rare. This type of anemia, of course, is treated as usual, and vitamin B12 seems to be definitely a necessity. The adrenal cortical steroids have been an extreme disappointment; in many instances in my own practice, they have been distinctly detrimental. Severe, hard-to-control hemor-

rhage has seemed to result from Cortisone therapy, though this is difficult to prove. ACTH in well regulated doses has been helpful, although the accompanying oversecretion of cortisone has produced some manifestations similar to those of adrenal cortical hypofunction. ACTH is much easier to use, though its influence on salt and water balance, alkalosis and neuropsychiatric reactions must be borne in mind. It is unquestionably extremely valuable in control of such remote manifestations as iritis and complications involving the skin and the joints.

The troublesome and insidious staphylococcus strains are usually sensitive to Tetracycline and Erythromycin.

One of the greatest disturbing factors in colitis in my own practice has been the use of milk in large quantities, particularly by the young. The great American habit of not weaning babies when they have acquired their teeth, has in a sense boomeranged upon us. Milk as a beverage is omitted from the hospital diet. Most of the patients we see are milk drinkers. The other animals, guided by nature's dictum, do not by any means follow man's direction. As soon as they get their teeth, the mother weans them, whereas we put our babies on cow's milk. If our human mothers had to provide the milk used by our milk drinkers, they would settle the question once for all; but that is another story and does not bear too much discussion. Suffice it to say that there are a great number of allergens present in milk that are not tolerated by the patient with colitis.

A record is maintained by the dietician indicating the type (usually high protein, acid ash), the amount and caloric value of the food intake and how it is tolerated. This becomes the patient's daily guide. His likes and dislikes are charted. Often im-

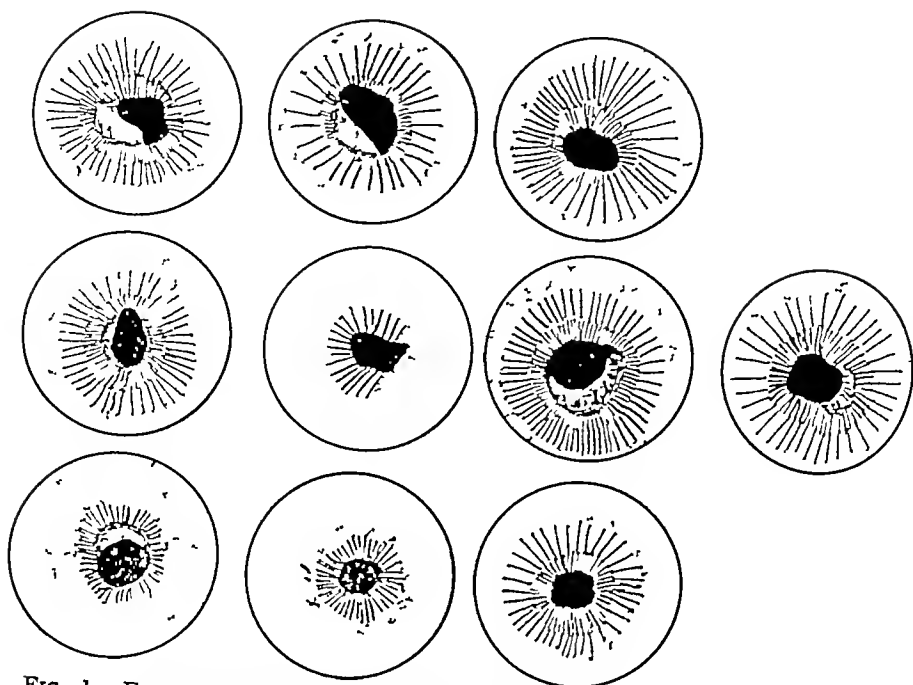


FIG 1—Experiment X Ten control cultures of sarcoma S37 The explants were obtained from an untreated animal (See p 471)

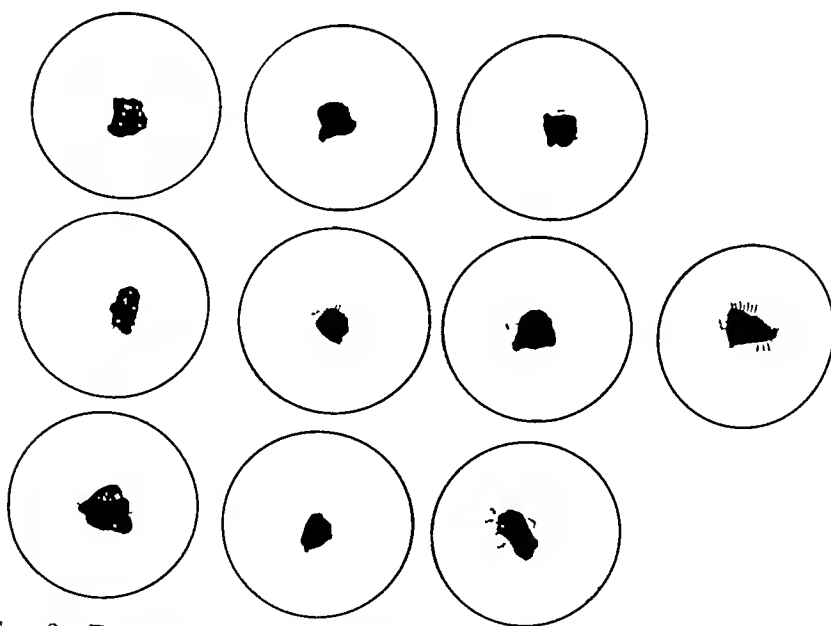


FIG 2—Experiment X Ten cultures of sarcoma S37 The explants were obtained from a mouse which had received 0.01 mg of colchicine 24 hours previously (See p 471)

with the ileum anastomosed to the proximal portion of the ileum. A program of watching and waiting cannot be condemned, although one must realize that pseudopolyps and frank polyp arising on an inflamed bowel wall from granulation may undergo malignant degeneration. Chronic intractable colitis with invalidism severe enough to interfere with gainful employment dictates elective colectomy.

Surgical intervention becomes urgent and may be graded according to the severity of the acute complications. Ileostomy of the "bit and run" type can be carried out very well with local anesthesia, if necessary. The usual indications are perforation, pericolic or perirectal abscesses, peritonitis, obstruction or the so-called fulminating phase with a rapid downhill course. Ileostomy and/or colectomy are in order if a persistent acute hemorrhage is encountered or if neoplastic change is suddenly detected. If a septic course persists in spite of antibiotics and supportive measures, the colon must be eliminated.

Many technical variations and combinations may be employed. Ileostomy alone may be resorted to in severe cases when the patients cannot tolerate one-stage colectomy. The purpose is to divert the fecal stream completely and reduce contamination of the peritoneal cavity. If a little time can be gained for rehabilitation of the patient, the other procedures, such as ileostomy with colectomy and procto-

sigmoidectomy or colectomy with ileosigmoidostomy, may be carried out. At times it is advantageous to perform ileostomy and colectomy and preserve the rectum for a future ileosigmoidostomy, if time is necessary to reclaim the rectal segment.

These experiences and conclusions are submitted as possibly worth consideration. I am convinced that it is advisable for the surgeon to act as his own internist and psychiatrist, though it is not always easy or feasible to do so. Certainly the psychogenic factors, not excluding sex behavior, should be recognized. The patients are puzzled, confused and easily disappointed, and they present fatigue syndromes most difficult to handle. Management in the manner outlined, is wearing on the physician but is his most satisfactory course, since he is the opposite type of person and has a remarkable reserve of ability to carry responsibility, not only for his own problems but for those of others. I permit my patients with colitis to call me at any time, day or night, if they are in distress, and only on a few occasions has the privilege been abused.

Still more work must be carried out in this field, of course, before more than a very few of the answers to this problem are apparent.

LANN A. PEARSON,
B.S., M.D., F.I.C.S., F.A.C.C.,
GRAND RAPIDS, MICHIGAN

When we investigate clinically some disease or some manifestation of it, we may be seriously handicapped by circumstances; but we are possessed of the certain knowledge that what we study is precisely what we set out to study.

Leone

animal *in vivo* had any effect on subsequent growth of the tumour *in vitro*. The alkaloid was administered by subcutaneous or intravenous injection and portions of the tumour removed for culture at varying intervals after treatment. Ten cultures were set up from each animal treated as well as ten from an untreated control. Only cultures which showed definite growth of interlacing cells were regarded as positive, scanty amœboid cells emigrating from the explant were not taken as true growth.

The results are summarised in the table. From them it can be seen that colchicine administered *in vivo* has a definite inhibitory effect on subsequent growth of the tumour *in vitro*.

HISTOLOGY OF NORMAL AND NEOPLASTIC TISSUES FROM ANIMALS TREATED WITH COLCHICINE

Technique

Colchicine made up as already described was injected under the skin of the left flank of a mouse. The quantity administered in each experiment was half of the minimal fatal dose namely 0.0015 mg per g of body weight. Only one injection was given. The animals were killed at various intervals after injection and kidneys, liver, lungs, spleen, thymus, adrenals, testes, ovaries, intestine and tumour tissue removed. Portions of these tissues were fixed in acetic sublimate (glacial acetic acid 2 per cent in perchloride of mercury 6 per cent), paraffin blocks prepared and sections cut at five microns. Films of bone marrow obtained from the upper end of the femur were fixed in the same solution. All preparations were stained by the Feulgen technique, thymus, spleen and bone marrow were in addition stained by hæmatoxylin-eosin-azur and the other tissues by hæmatoxylin and eosin.

Results

Intestine Nothing abnormal was seen until the *fourth hour* after injection when there was a moderate increase in the number of cells in the crypts of Lieberkuhn showing mitotic figures, all in the stage of prophase or early metaphase. Stained with H and E the cytoplasm of these cells appeared granular and the chromatin stained densely and uniformly giving the appearance of a pyknetic nucleus in a somewhat degenerate cell. In Feulgen preparations, however, the chromosomes were clear cut and distinct.

Six hours after injection there was a great increase in the number of mitotic cells in the crypts all in the stage of prophase or early metaphase. In many of the crypts the continuity of the layer of columnar cells was interrupted by gaps from which cells had disappeared.

Le Diagnostic du Cancer D'Estomac a la Période Utile (Diagnosis of Cancer of the Stomach at the Time Most Favorable for Treatment. By René A. Gutmann. Paris: G. Doin et Cie, 1956. Pp. 257.

The author emphasizes the importance of making early diagnosis of carcinoma when it is amenable to operation. He describes three types of early carcinoma of the stomach; mucosal, submucosal, and "small cancer" (less than 1 cm. in diameter). Attention is called to the fact that the classic symptoms of gastric carcinoma may be entirely absent during the early stages, and in many such instances the patient's complaints are attributed to ulcer or dyspepsia. In some instances carcinoma develops over a long period of years. The patient's age is no great factor in its development.

The chapter on roentgenologic study (written by Mme. le Docteur Jacqueline Daoud) covers 126 pages and is illustrated by many diagrams. Diagnostic points are discussed in detail. The author states, contrary to current opinion, that roentgenographic diagnosis of early carcinoma of the stomach can be made in many instances. She describes the technic she considers essential for proper visualization. Fluoroscopic study is of no value except to verify what has already been demonstrated by properly taken roentgenograms. She describes the roentgenographic appearance of the infiltrating, ulcerative and fungating types of gastric carcinoma. There are numerous instructive sketches.

Dr. Gutmann disagrees with the opinion that gastroscopic study is important in the diagnosis of early carcinoma, but concedes that it is useful in confirming a diagnosis already established roentgenographically.

In the chapter on supplementary methods of diagnosis he mentions laparoscopic study, which, in his opinion, has little value. It does, however, confirm the presence of late carcinoma with metastatic involvement of the liver and peritoneum, at which stage the lesion is inoperable.

In summarizing the chapter on cytologic study (written by Prof. Laumonier) the author states that, while it may be an interesting method, it has little value in diagnosing early carcinoma, since it has not yet been sufficiently developed to be accurate.

There is little relation between gastritis and early carcinoma, but late carcinoma may be secondary. The author discusses precancerous lesions: ulcer, gastritis and the polypi accompanying pernicious anemia. He is convinced that any recurring gastric disturbances should be considered serious until otherwise diagnosed.

Dr. Gutmann stresses repeatedly the importance of well-taken roentgenograms and their proper interpretation in the diagnosis of early carcinoma of the stomach, which is often overlooked. He records his wide experience in its diagnosis and treatment. The text includes 155 illustrations, and there is an additional group of 348 more, all well done. There is a summary in English at the end of each chapter, which will facilitate the reading of this book.

CHARLES PIERRE MATHÉ, M.D.

L'Hemisphérectomie (Hemispherectomy). By E. Laine and Claude Gros. Paris: Masson et Cie, 1956. Pp. 134, with 31 illustrations.

This monograph is based on the authors' experiences during the past five years with 39 hemispherectomies. In 32 instances the procedure was carried out because of encephalopathy and in 7 because of tumor. There was an extensive angioma in 1 of the encephalopathic patients and thrombosis of the internal carotid artery in another. In the remaining 30 the encephalopathy dated from early in life.

The surgical technic is thoroughly described and well illustrated. The advisability of preserving the basal ganglia is thoroughly discussed, and the postoperative studies are thorough and well organized. Selection of cases, operative indications and contraindications, preoperative studies, the results are all thorough.

metaphase, chromosomes may show longitudinal division but there the process stops. There may be an attempt at orientation of the chromosomes into the usual metaphase figure but the characteristic formation of an equatorial plate is seldom seen. The ultimate fate of these cells seems to be death and disintegration. It is possible, as Ludford suggests, that some may survive and ultimately divide when the effect of the drug has passed off, but the appearances seen in these sections suggest that all the cells caught in the act of mitosis during the first four to eighteen hours die and disintegrate. The chromosomes fuse and form a solid mass of chromatin, degenerative changes make their appearance in the cytoplasm and ultimately the cell membrane disappears leaving the mass of chromatin free in the crypt. Later waves of mitosis affecting surviving cells are able to fulfil their destiny as the effects of the alkaloid pass off and eventually the destroyed epithelium is replaced. Undoubtedly there are variations in this process depending on the dose and method of administration of the drug as well as on that imponderable variant the biological activity of the experimental animal, but the main effect of the drug is undoubtedly inhibition of mitosis in the stage of metaphase.

Spleen *One hour* after injection there was no significant change except, perhaps, a slight increase in the number of cells in mitosis in the Malpighian corpuscles. *After two hours* there was a significant increase in the number of cells in mitosis in the splenic pulp with a less notable increase in the Malpighian corpuscles. Hæmatoxylin-cosin-azur preparations showed that the cells affected were of the reticulum type but in the pulp there were also some cells lying free in the sinuses which resembled erythroblasts and might have been blood borne, the majority, however, were cells lining the sinuses. Feulgen preparations showed that most of the cells in mitosis were in prophase or early metaphase but some anaphase and telophase forms were still to be seen. Mitotic figures were still more numerous after *four hours*, the increase in numbers being chiefly in cells of the pulp. Anaphase and telophase forms were rare. There was no great change in the picture as just described after *six, eight and ten hours* but anaphase and telophase forms were not seen. In Feulgen preparations there were some signs of commencing degeneration such as clumping, fusion and some fragmentation of chromosomes. *Twelve hours* after injection the appearances in the splenic pulp called to mind those seen in the crypts of the intestine after a similar interval. Some of the sinuses were almost denuded of their lining cells and many of those remaining were in mitosis or contained pyknotic masses of chromatin in which outlines of chromosomes might still be distinguished. In the Malpighian corpuscles there were also a number of cells in mitosis or with

are the virtues of this unusually simplified presentation of the standard, well-established surgical procedures, built upon excellent step-by-step illustrations of major and minor aspects of surgical technic.

The editors have designed this set as a companion to *British Surgical Procedures* to which they refer the reader for more extended treatment of surgical topics. Aside from some general advice they have omitted detailed discussion of such crucial subjects as diagnosis and investigation, preoperative and postoperative care and clinical and pathological data.

It is their view that visual experience is superior to the written description; hence their decision to base their book on a set of semischematic drawings. Accordingly, they have reduced the text to a minimum; it consists for the most part, of explanation of the illustrations.

A further major policy has been to invite contributions by specialists for each of the various regions of the body and the various fields of surgery. Although requested to cover the common variations in technic, the contributors have been asked to concentrate especially on those which they personally prefer from their own experience. The authority thus gained is of course essential to the main purpose of this work, which is to supply information on procedures not fully familiar to the general or special surgeon working in an unfamiliar field. It is likewise of inestimable advantage to the postgraduate surgical student or the resident in surgery. In this reviewer's opinion this feature will even prove valuable to the experienced specialist, who might not or-

dinarily be expected to require such a manual but might on occasion care to review the informed preferences of the contributors, so conveniently recorded in these pages.

From these several points of view *Operative Surgery* is a superior ready reference, one that should find a place among the more popular surgical standbys. It is sincerely hoped that the remaining volumes will appear without undue delay.

R. L.

Anesthesia for Surgery of the Heart. By Kenneth K. Keouri. Publication 304, American Lecture Series. Springfield, Ill.: Charles C Thomas, Publisher, 1956.

A new and difficult surgical field as seen through the eyes of an anesthesiologist is presented by the author of this compact volume. Success in this difficult field is achieved only through the efforts of a closely knit, smoothly functioning team of doctors. Here mutual respect and frank discussions in the selection of patients as well as in the problems attending the surgical, medical and anesthesiologic management of patients strike the keynote.

In concise and easily readable form, the author provides pathophysiologic information, disease states, laboratory data, mortality statistics for various procedures, as well as his own techniques of anesthesia management for various procedures. This small volume will be an asset not only to the fledgling or practicing anesthesiologist but to the library of every hospital, physician and medical student, regardless of the latter's special interests or stage of training.

DAVID KATZ, M.D.

To be possessed of a vigorous mind is not enough, the prime requisite is rightly to apply it. The greatest minds, as they are capable of the highest excellences, are open likewise to the greatest aberrations; and those who travel very slowly may yet make far greater progress, provided they keep always to the straight road than those who, while they run, forsake it.

—Descartes

after which period appearances varied in preparations from different animals, until in the *forty-eighth hour* conditions were once more normal

Liver Only very slight changes were seen in the liver. Sections examined up to *forty-eight hours* after injection showed no increase in the number of mitotic figures in any cell type but from the *sixth* to the *thirtieth hour* the nuclei of the Kupffer cells appeared more prominent than normal

Gonads A detailed investigation of the effects of colchicine on meiosis was not attempted only the most outstanding changes have been noted

In the testes there appeared to be a slight inhibition of mitosis in some of the spermatocytes. This inhibition was first seen about *four hours* after administration and lasted *twenty-four hours*. Though many of the cells affected showed signs of degeneration such as fusion of the chromosomes and fragmentation of the resulting mass of chromatin there did not appear to be any extensive cellular destruction, nor did the inhibition appear to affect seriously maturation of the spermatozoa. In the tubules of all preparations taken up to *forty-eight hours* after administration mature spermia were present and there was no gross reduction in their numbers as far as could be judged by inspection

In the follicular cells of the ovary there was a moderate increase in the number of cells in mitosis and in the stroma cells a very slight increase. Anaphase and telophase forms were scanty. These changes persisted for about *twelve hours* after which time nothing abnormal was observed. There were none of the extensive degenerative changes seen in other organs and on the whole the effect was slight

Kidneys, lungs, adrenals Only in the adrenals were any changes seen. These consisted of a very slight increase in the number of mitotic figures usually found in the outer part of the zona fasciculata which appeared *fourteen hours* after injection, was decreasing *twenty hours* after injection and had disappeared after *thirty hours*. During this period all mitoses were of prophase or metaphase type. There was no cell destruction, fusion or fragmentation of the chromosomes. It seems probable that the effect of the drug on this organ was only to delay division and that the cells in which mitosis was inhibited eventually completed the cycle and did not degenerate

Bone marrow Here also the effect of the alkaloid appeared to be similar to that in other organs, namely inhibition in metaphase of mitosis in cells normally in a state of active division—hemocytoblasts, erythroblasts and cells of the granular series, followed by fusion of chromosomes degeneration and disintegration of the affected cells. The course of events appeared to be as follows

these experiments, regeneration proceeding from its normal edge toward the anastomosis.

THOMAS WILENSKY, M.D.

Sex Hormone Excretion After Bilateral Adrenalectomy and Oophorectomy in Patients with Mammary Carcinoma. Strong, J. A.; Brown, J. B.; Bruce, J.; Douglas, Mary; Klopfer, A. I., and Loraine, J. A., *Lancet* 1: 955, 1956.

The excretion of sex hormones by a postmenopausal patient before, during and after bilateral adrenalectomy and oophorectomy are described in this study, in detail and very commendably.

It is concluded that the small amount of hormone excreted by such a patient after an operation was not derived from adrenocortical tissue.

None of the patients responded to intravenous infusion of corticotrophin. The pattern of hormone excretion in patients who responded favorably to the operation did not differ from that in patients who showed no improvement after the removal of both adrenals and ovaries.

EDMUND LISSACK, M.D.

The Behavior of Carcinoid Tumors of the Intestinal Tract. Spain, D. M., *Am. J. Gastroenterol.* 26:162, 1956.

Carcinoid tumors may occur in any area of the gastrointestinal tract, involving the stomach and rectum on occasion. It is estimated that 1 per cent of all gastrointestinal tumors are carcinoids. Those examples of carcinoid that run a benign course cannot be differentiated on histologic grounds from those which infiltrate and ultimately metastasize. Carcinoid tumors are frequently malignant, but long survival in the presence of metastases is not uncommon. Benign carcinoid tumors may produce a variety of manifestations as a result of local involvement of the intestinal tract; e.g., obstruction, intussusception, diarrhea, hemorrhage, pain and loss of weight. It is estimated that from 80 to 95 per cent of all carcinoids are located in the region of the ileocecal valve; the most frequent site in the small intestine is the ileum. A biopsy specimen of rectal car-

cinoid may be mistaken for carcinoma, or may reveal no tumor cells because of the deep submucosal type of growth. A current concept is that all carcinoid tumors must be regarded as potentially malignant.

The syndrome associated with malignant carcinoid consists of predominantly right-sided valvular endocardial fibrosis, a peculiar type of cutaneous telangiectasia, cyanosis and blushing secondary to vasomotor changes and asthma-like symptoms due to bronchoconstriction. The substance responsible for this syndrome is believed to be a 5-hydroxytryptamine, regarded as a specific hormone of the enterochromaffin cell system and also elaborated in great quantities by carcinoid tumors. It is also present in the urine of patients with metastatic carcinoid. This is used as a diagnostic test. This substance is believed to be responsible for the attacks of flushing, the skin manifestations and the occasional asthmatic attacks that may occur in this syndrome. Attempts to reproduce the endocardial lesions experimentally in rabbits with 5-hydroxytryptamine have so far failed.

J. RICHARD MOORE, M.D.

Some Aspects of the Mechanics of the Abdomen. Adno, J., *South African M. J.* 30: 535, 1956.

This interesting and stimulating paper represents the results of the author's proings into the vast unexplored field of knowledge pertaining to the mechanics of the abdomen and the abnormalities that may result, at least in part, from disturbances and failures of the mechanical forces considered.

In order to record intraperitoneal, intragastric and intraurinary vesical pressures the author utilized a polythene catheter filled with physiologic solution of sodium chloride and an electrical strain-gauge attached to an amplifier and a recording unit. The readings were accurate, and a record of the slightest variation was readily obtained. With this apparatus the author was able to refute the generally held impression that the intra-abdominal pressure is negative. By this means he was able to demonstrate that the intraperitoneal pressure is positive except for a low-pressure area im-

CONCLUSIONS

1 Colchicine in the doses used had no inhibitory effect on growth of mouse sarcoma S 37 *in vivo*

2 Growth *in vitro* of tumour tissue obtained from an animal treated with colchicine was inhibited to a marked extent

3 The effect of colchicine on mitosis is an inhibitory one It does not prevent cells entering into mitosis but interferes with completion of the cycle

4 The tissues most affected by colchicine are those in which rapid cell division is normally in progress

5 Sarcoma S 37 is less affected by colchicine than many normal tissues

I wish to express my thanks to the Sorella Trustees not only for their endowment of the Fellowship under which this work was done but also for their generous financial assistance towards equipment of the laboratory

To Dr J A Murray, late Director of the Laboratory of the Imperial Cancer Research Fund I wish also to convey my thanks for supplying me with a strain of the mouse sarcoma S 37

For constant encouragement, advice and assistance I am deeply indebted to Professor J S Young

REFERENCES

- | | | |
|---------------------------|------|---|
| AMOROSO, E C | 1935 | <i>Nature</i> , cxxxv 266 |
| BRUES, A M | 1936 | <i>J Phys</i> , lxxvii 63 F |
| DIXON, W E | 1906 | A manual of pharmacology London,
p 95 |
| DIXON, W E, AND MALDEN, W | 1908 | <i>J Phys</i> , lxxviii 50 |
| DUSTIN, A P | 1934 | <i>Bull Acad Roy Med Belg</i> , xiv 487 |
| FÜHNER, H | 1920 | Handbuch der experimentellen Pharmacologie, vol II, part I, p 492 |
| LITS, F | 1934 | <i>C R Soc biol</i> , cxx 1421 |
| LUDFORD, R J | 1936 | <i>Arch exp Zellforsch</i> , xviii 411 |

Carcinoma in the Medial and Lateral Halves of the Breast. Pierce, E. H.; Kirklin, J. W.; McDonald, J. R., and Gage, R. P., Surg. Gynec. & Obst. 103:759, 1956.

In this study, 416 cases of carcinoma in the breast were studied. In 364 the lesions proved to be adenocarcinomas; in 41, comedocarcinomas; in 10, Paget's disease, and in 1, liposarcoma.

The breast was the site of the lesion in 43.3 per cent; the medial half in 30.3 per cent, and the lateral half in 61.5 per cent. In the remaining 8.2 per cent the tumors were centrally located.

The five-year survival rate for the entire group was 61 per cent: lateral tumors 62.9 per cent, medial tumor 58.7 per cent and centrally located tumors 54.5 per cent.

Patients with lesions located in the lateral half of the breast and with axillary metastases showed a five-year survival rate of 42.1 per cent. Without axillary metastases the five-year survival rate was 82.3 per cent.

EDMUND LISSACK, M.D.

Advanced Mammary Cancer Treated with Sex Hormones. Lewison, E. F., and Trimble, F. H., J.A.M.A. 162:1429, 1956.

Although the sex hormones are certainly not a "cure" for advanced mammary carcinoma, in the total care of this disease they do offer profound and gratifying care and benefits for patients beyond the scope of surgical and roentgen therapy. The authors considered themselves justified in using the initial palliative benefits of hormone therapy before considering the more drastic operative procedures, such as adrenalectomy or hypophysectomy.

One hundred and thirty-three patients were given 233 complete courses of sex hormone therapy for advanced mammary carcinoma. The choice between estrogen and androgen was made principally in relation to the physiologic age of the patient in reference to the menopause. Estrogens were used only after five years had passed since the menopause, whereas androgens proved useful to both premenopausal and postmenopausal patients. For elderly patients, however, estrogen appeared to be the hormone of choice.

EDMUND LISSACK, M.D.

I have mentioned good humor as one of the preservatives of our peace and tranquility. It is among the most effectual, and its effect is so well imitated and aided, artificially, by politeness, that this also becomes an acquisition of first rate value. In truth, politeness is artificial good humor, it covers the natural want of it, and ends by rendering habitual a substitute neatly equivalent to the real virtue.

—Jefferson

secretory cells by a squamous stratified epithelium (figs 6, 7) The metaplastic change, once begun, seems to proceed with equal facility whether affecting the epithelium of the duct or the secreting cells of the gland In the specimens examined, however, the metaplasia has not been complete, shrunken remains of the most peripherally situated glandular epithelium being visible here and there The cytoplasm of these shrunken cells is coloured pink in sections stained with eosin and hæmatoxylin, whereas the large secreting cells of a normal gland are coloured a pale blue

A wide-spread destruction of acini *en masse* has been seen, the manner of this destruction resembling that which occurs in the breast during involution

In some instances cystic dilatation of the bulbo-urethral gland has occurred and may be attributed perhaps to stenosis of the duct through metaplasia at a stage when secretion is still taking place in the body of the gland Suppuration has not infrequently supervened In some instances it may have been caused by an infection of the retained products of secretion, in others the suppuration may possibly have been a direct consequence of the metaplasia The writer (Burrows, 1935*a*) previously has drawn attention to the frequency with which a leucocytic invasion follows epithelial metaplasia, however induced, and apart, as he believes, from bacterial infection

The gradient of susceptibility to œstrone, as shown by this progressive spread of metaplasia from its starting point at the urethral end of the duct until nearly the whole bulbo-urethral gland has become involved, deserves a joint consideration with similar gradients observed in other organs influenced by œstrogens (Loeb, 1928, Burrows, 1935*b*) A plausible hypothesis might attribute the progressive advance of metaplasia to some influence passed on to adjacent cells either from those which are responding already to the œstrogen or from the new metaplastic cells which have appeared as the result of such a response The gradual and almost orderly extension of the cellular changes might seem easy to explain in this way Such an explanation however must be abandoned on general grounds, because it can be shown that the gradient of response to œstrogens does not depend on continuity of structure Transplanted portions of uterus, vagina, coagulating gland or seminal vesicles respond to œstrogens as they would if remaining in their natural positions (unpublished experiments by the author) The gradients of responsiveness to œstrogens shown by these individual tissues appears therefore to be inherent in their component cells, and must be governed, it seems, by some biological principle other than a direct transmission of susceptibility from cell to cell in continuous series during the progress of the experiment

NEW, IMPROVED MUELLER-BALFOUR ABDOMINAL RETRACTOR



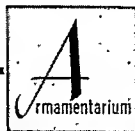
SU-3040—Complete .. \$75.00

Now the interchangeable, spring-tempered wire blades lock simply, but securely, in the side arms *without* thumb screws or other losable parts.

This versatile Retractor has the exclusive spring-latch construction and wide bar, notched for easy adjustability and permanent non-slip retention.

With its adaptability and its six interchangeable blades, the Mueller-Balfour Retractor is both a standard retractor and a deep retractor—in one instrument. Stainless steel.

As described in Armamentarium Vol. II, No. VIII.



MUELLER & CO.

330 South Monroe Street

Chicago 12, Illinois

Dallas • Houston • Los Angeles • Rochester, Minn.

SUBSCRIBE

to the

*Journal, International
College of Surgeons*



For details see

"INFORMATION"

Page XVIII

THE
IMPROVED

Padgett-Hood
DERMATOME



SIMPLIFIES
SKIN
GRAFTING

Accurate and uniform grafts up to 4 inches wide, 8 inches in length. Inexpensive **THROW-AWAY BLADES, DERMATOME TAPE**, and other accessories available for all models.

Write Today for Complete Information

KANSAS CITY ASSEMBLAGE CO.
816 LOCUST • KANSAS CITY, MO.



The Journal of the International College of Surgeons

PUBLICATIONS

The Journal. The Journal of the International College of Surgeons is one of the important surgical journals in the modern surgical world. The names of many of its contributors are world-famous. It is published monthly and offers from fifteen to twenty original scientific articles in each issue, all of which are *summarized in six languages*. In addition, it carries reviews of important new books and abstracts of the current surgical literature.

Any surgeon, whether or not a member of the College, is welcome to submit his work to the Journal. Indeed, although many of our regular contributors are Diplomates of the College, scarcely an issue appears without articles written by non-members as well.

The Bulletin. Formerly the Journal also carried news of the College to all its members and friends. Lately, however, the need of Journal space for the immense number of valuable scientific papers submitted has led to the establishment of a supplementary monthly Bulletin for that purpose.

A sample copy may be had on request. The subscription rate is \$14.50 annually for 12 issues, published monthly.

Joseph J. Boris, Circulation Manager
10 Columbus Circle, New York 19, N. Y.



The Journal of the International College of Surgeons

FOUNDED IN GENEVA, SWITZERLAND, 1935, BY DR. ANDRÉ CROTTI
INCORPORATED IN WASHINGTON, D. C., 1940

Vol. XXVII

MAY, 1957

No. 5

General Surgery

Degastroenterostomy

JOSEPH E. BELLAS, M.D., F.A.C.S., F.I.C.S., D.A.B.

PEORIA, ILLINOIS

DEGASTROENTEROSTOMY — removal of a gastroenterostomy—is an operation that ought to be obsolete, but until the results of gastric operations attain a level of 100 per cent effectiveness, it will behoove surgeons to retain an intimate familiarity with this procedure.

Indications.—In discussing degastroenterostomy, one must assume that gastroenterostomy has been done for peptic ulcer, real or phantom. Degastroenterostomy consists of removing an existing gastroenterostomy for the following indications: (1.) malfunction of the anastomotic stoma, (2.) secondary peptic ulcer occurring at or about the stoma, or (3.) gastrojejunal fistula.

1. Malfunction of a gastroenterostomy includes (a) vicious circle, (b) a contracted stoma with gastric retention and (c) a wide open stoma without vicious circle complications, without secondary peptic ulcer but with gastric retention.

In most instances the cause of malfunction can be traced to an improper indication for the operation or improper performance of the anastomosis. Occasionally, however, despite proper indications and performance, patients have disturbing symptoms due to gastric retention, regardless of an open stoma and the absence of secondary peptic ulcers. This condition was formerly known to surgeons as "gastroenterostomy disease" for lack of a better name. I suppose that the disturbance is associated with imbalance of the neuromuscular apparatus of the stomach, but I confess that this may be just an-

Read before the Illinois Surgical Society, Champaign, Aug. 25, 1956, the Illinois Chapter of the American College of Surgeons, Belleville, Sept. 29, 1956, and the North Central Illinois Medical Association, Princeton, Nov. 18, 1956.
Submitted for publication Feb. 11, 1957.

afferent and efferent loops in good relation and no evidence of a secondary peptic ulcer. At that time I did not consider a radical procedure justifiable, and the operation was completed by closing the gastrotomy wound.

For the next year the patient complained of occasional stomach trouble, characterized principally by belching. Toward the latter part of the year there were recurring attacks of pain in the right upper part of the abdomen, accompanied by belching and flatulence. The patient had occasional diarrhea and lost weight. Roentgen studies of the upper part of the gastrointestinal tract showed unexplained 40 to 50 per cent retention of gastric contents (Fig. 1).

Gastric resection was recommended and undertaken. A degastroenterostomy, reconstruction of the jejunum and a gastric resection with an anterior end-to-side gastrojejunostomy were done (Fig. 2). No sign of the original duodenal ulcer or a secondary jejunal ulcer could be found. No mechanical cause was seen for the malfunctioning gastroenterostomy. In the postoperative period, considerable time elapsed before the patient had stabilized himself so as to drink and eat without regurgitation. I do not know what the final outcome of this case will be, but since August 1, 1955, the patient has remained stabilized.

CASE 2.—A man aged 61 presented himself on Nov. 30, 1954, with the following symptoms: (a) loss of 40 pounds (18.1 Kg.) in the preceding five months; (b) change of bowel habits (he had formerly been constipated, but for the past four months, his stools had been watery, light and frequent; sometimes the food, such as milk, sausage, celery, olives and green vegetables, would go through unchanged); (c) poor appetite, frequent vomiting and fetid belching in the past four months, and (d) progressive loss of strength and energy.

The most significant thing in his history was an operation performed at the Mayo Clinic thirty years earlier for "ulcers and gallbladder." In the years that followed the patient's initial relief gave way to recurring complaints of gastric distress. It was relieved somewhat by antacids, but in recent months these had failed to relieve him. He had maintained a fair degree of occupational usefulness until five months prior to consulting me.

Physical examination revealed the patient to be tall, depleted and cachectic, with a dispirited, resigned attitude. Apart from the pres-



Fig. 1.—Roentgenogram showing 40 to 50 per cent five-hour retention of gastric contents.

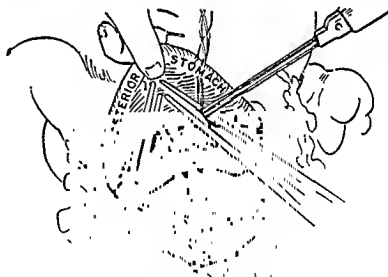


Fig. 2.—Approach to degastroenterostomy by a shallow V resection between clamps at the expense of the stomach. (After Pfeiffer.)

ence of an old paramedian scar over the right upper portion of the abdomen, however, nothing of significance was discovered.

Because of the change in bowel habits, a roentgen study of the colon was done first. The roentgenographic appearance suggested that an upper gastrointestinal roentgeno-

Results

The results showed little variation in the sugar media from strain to strain, and most "sugars" gave constant results for all strains. Of the other special reactions studied, indole production and motility varied most, 70 per cent produced indole and 60 per cent were non motile after 4 hours' and 24 hours' incubation in ox heart broth. A composite description is given below which illustrates the findings.

Morphology Gram negative rods similar in size and shape to *coli* typhoid group 1 c 2.7 μ by 0.5 μ . Long forms up to 15 μ occasionally encountered.

Motility This varied, slightly larger number of non motile forms being found in present study.

Colony appearance Two types of colony were found, one smooth, slightly raised and dirty-white, the other larger, flattened, irregular in outline and yellowish in colour on MacConkey's agar. On moist ordinary agar, in subcultures, all strains grew luxuriantly, most of them giving a proteus like growth.

Broth Uniform turbidity without pellicle formation.

Indole Most strains produced indole.

H₂S Most strains did not produce H₂S.

Methyl red and Voges Proskauer reactions Methyl red positive one strain (South African Institute) Voges Proskauer positive, the rest negative.

Milk Acid and clot in most cases, four strains acid only, no acid \rightarrow alkali reaction after 14 days' incubation (phenol red milk).

Hæmolysis Non hæmolytic.

Gelatin No liquefaction.

"Sugars" Glucose, mannitol, sucrose, maltose, arabinose, xylose and rhamnose fermented (acid and gas) within 24 hours. Lactose and salicin fermented after varying periods from 2-12 days, but occasionally only acid produced. Dulcitol, inositol and inulin not fermented within 14 days. A few strains did not ferment salicin.

TABLE I

Biochemical reactions of ten strains of *B. asiaticus* examined serologically

Strain	Lactose	Salicin	Indole	H ₂ S	V P R	Phenol red milk	Motility
1	AG 5	—	+	—	—	A	—
2	AG 5	AG 3	+	—	—	AC	—
3	AG 12	AG 4	+	—	—	A	—
4	AG 10	AG 3	+	—	—	AC	—
5	AG 3	AG 10	+	—	—	AC	+
6	AG 6	—	—	—	—	AC	+
7	AG 6	—	—	—	—	AC	+
8	AG 4	AG 3	+	—	—	A	—
S A I M R	AG 2	AG 1	—	v f tr	+	AC	+
N C T C	AG 8	AG 3	—	—	—	AC	—

S. A. I. M. R. = *B. asiaticus*, from South African Institute of Medical Research.

N. C. T. C. = *Bact. asiaticum mobilis* Castellani, from National Collection of Type Cultures.

Figures in table, e.g. AG 5 = acid and gas after five days' incubation at 37° C. All strains produced acid and gas in sucrose, glucose, mannitol, maltose, arabinose, rhamnose and xylose. None produced acid or gas in dulcitol, inositol or inulin. None liquefied gelatin or produced hæmolysis in blood agar. All were methyl red positive.

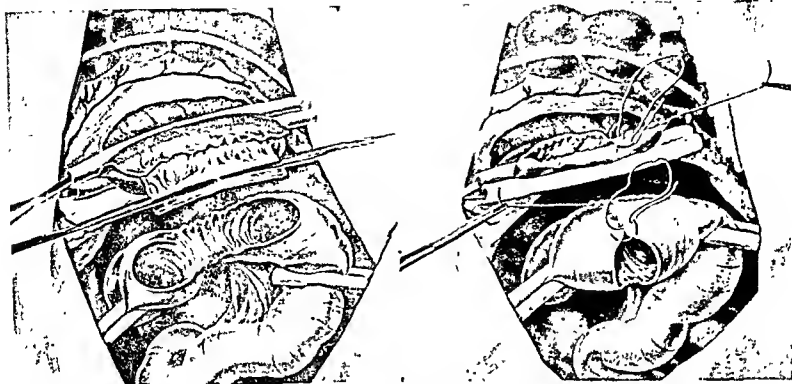


Fig. 5.—*Left*, degastroenterostomy and excision of gastrojejunal stoma. *Right*, reconstruction of jejunum. (After Spivack.)

This maneuver, coupled with the use of Upjohn's mycifradin, which sterilizes the intestinal contents, permits the inevitable inflammatory reaction around the fistulas to subside materially. During the interval of three or four months before the second stage, this patient lost his toxic feeling and appearance and began to believe that there was some hope. The presence of the colostomy is admittedly a nuisance during the entire course of the management, but it must be borne. A course of mycifradin was given for three or four days before the second stage.

In the second stage one will encounter many adhesions in and around the fistulas, and they must be reduced so that one can identify the abnormal fistulas. This is particularly difficult if a retrocolic gastrojejunostomy has been done, as in this case. I noted that the location of the gastrojejunal anastomosis is most easily found and its disengagement most readily performed if one enters the lesser peritoneum through the gastrohepatic omentum first. The attachment of the trans-

verse mesocolon to the stomach must be separated, with constant awareness that the middle colic artery must not be injured. Manipulation, from above as well as from below the transverse mesocolon, will keep one more conscious of the relations and will reduce this hazard. The stomach above the anastomosis is divided between two crushing clamps so as to liberate the gastrojejunal anastomosis, still attached to the jejunum, at the expense of the stomach (Fig. 2).

The site of the jejunocolic fistula is then cleared of adhesions, and two series of clamps are placed in wedge-shaped fashion over the transverse portion of the colon on each side of the fistula beyond the limits of palpable induration. The defect in the transverse portion of the colon is then sutured in a transverse direction. Because of the diversion of the fecal current by the ascending colostomy and the sterilizing effect of the mycifradin, one need not fear contamination (Fig. 4).

The jejunal loop is then opened, and the areas of the gastric

Results

The results showed little variation in the sugar media from strain to strain, and most "sugars" gave constant results for all strains. Of the other special reactions studied, indole production and motility varied most, 70 per cent produced indole and 60 per cent were non motile after 4 hours' and 24 hours' incubation in ox heart broth. A composite description is given below which illustrates the findings.

Morphology Gram negative rods similar in size and shape to *coli* typhoid group 1 c 2.7 μ by 0.5 μ . Long forms up to 15 μ occasionally encountered.

Motility Thus varied, slightly larger number of non motile forms being found in present study.

Colony appearance Two types of colony were found, one smooth, slightly raised and dirty white, the other larger, flattened, irregular in outline and yellowish in colour on MacConkey's agar. On moist ordinary agar, in subcultures, all strains grew luxuriantly, most of them giving a proteus like growth.

Broth Uniform turbidity without pellicle formation.

Indole Most strains produced indole.

H₂S Most strains did not produce H₂S.

Methyl red and Voges Proskauer reactions Methyl red positive one strain (South African Institute) Voges Proskauer positive, the rest negative.

Milk Acid and clot in most cases, four strains acid only, no acid-alkali reaction after 14 days' incubation (phenol red milk).

Hemolysis Non hemolytic.

Gelatin No liquefaction.

"Sugars" Glucose, mannitol, sucrose, maltose, arabinose, xylose and rhamnose fermented (acid and gas) within 24 hours. Lactose and salicin fermented after varying periods from 2-12 days, but occasionally only acid produced. Dulcitol, inositol and inulin not fermented within 14 days. A few strains did not ferment salicin.

TABLE I

Biochemical reactions of ten strains of *B. asiaticus* examined serologically

Strain	Lactose	Salicin	Indole	H ₂ S	V P R	Phenol red milk	Motility
1	AG 5	—	+	—	—	A	—
2	AG 5	AG 3	+	—	—	AC	—
3	AG 12	AG 4	+	—	—	A	—
4	AG 10	AG 3	+	—	—	AC	—
5	AG 3	AG 10	+	—	—	AC	+
6	AG 6	—	—	—	—	AC	+
7	AG 6	—	—	—	—	AC	+
8	AG 4	AG 3	±	—	—	A	—
SAIMR	AG 2	AG 1	—	✓ f tr	+	AC	+
NCTC	AG 8	AG 3	—	—	—	AC	—

SAIMR = *B. asiaticus*, from South African Institute of Medical Research

NCTC = *Bact. asiaticum mobilis* Castellani, from National Collection of

Typo Cultures

Figures in table, e.g. AG 5 = acid and gas after five days' incubation at 37°C

All strains produced acid and gas in sucrose, glucose, mannitol, maltose, arabinose, rhamnose and xylose. None produced acid or gas in dulcitol, inositol or inulin. None liquefied gelatin or produced hemolysis in blood agar. All were methyl red positive.

tomy and of the Pfeiffer multistage method for gastrojejuno-colic fistula are described.

RÉSUMÉ

La dégastro-entérostomie est une partie importante de la thérapeutique des affections suivantes: a) mauvaise fonction d'un stoma anastomique; b) ulcère peptique secondaire au niveau du stoma; c) fistule gastro-jéjuno-colique.

Les facteurs et les principes du traitement sont exposés. Le choix des procédés est discuté à l'appui de deux cas. Description des détails de la dégastro-entérostomie, et de la technique en plusieurs temps selon Pfeiffer pour la fistule gastro-jéjuno-colique.

SUMARIO

A degastroenterostomia—a remoção de uma gastroenterostomia — é um método importante para solucionar:

a) a disfunção de um stoma anastomótico; b) uma úlcera péptica secundária que se tenha estabelecido no ou em volta do stoma; c) a fistula gastro-jejuno-cólica.

Os fatores relativos ao tratamento e seus princípios são apresentados no trabalho. São discutidos os métodos em relação aos dois casos. Pormenores da degastroenterostomia e o método de estagios múltiplos de Pfeiffer para a fistula gastro-jejuno-cólica são descritos.

ZUSAMMENFASSUNG

Die Degastroenterostomisierung, d.h. die Entfernung einer Gastroenterostomie, bildet einen wichtigen Teil eines Gesamtangriffes, der die Heilung der folgenden Krankheitszustände zum Ziel hat:

a) Fehlerhafte Funktion der Anastomosenöffnung.

b) Sekundäres peptisches Geschwür an oder in der Nähe der Anastomose.

c) Gastrojejunkolische Fistel.

Die Einzelheiten und die Grundsätze der Behandlung werden umrissen. Die Möglichkeit der Auswahl unter verschiedenen Massnahmen wird erörtert und an Hand von zwei Fällen erläutert. Die Einzelheiten der Degastroenterostomisierung und der Pfeifferschen Behandlungsmethode der gastrojejunkolischen Fistel in mehreren Stadien werden beschrieben.

RIASSUNTO

La degastroenterostomia, cioè la demolizione di una gastroenteroanastomosi è il tempo principale di qualunque metodo diretto a curare (a) uno stoma non funzionante; (b) un'ulcera recidiva sull'anastomosi e (c) una fistola gastrodigiunocolica.

Vengono elencati i metodi e le loro basi, gli elementi di scelta del tipo di intervento e i rapporti con i due casi presentati. Viene descritto l'intervento di degastroenterostomia e il metodo in più tempi, di Pfeiffer per la cura della fistola gastrodigiunocolica.

RESUMEN

La degastroenteroanastomosis ó extirpación de una gastroenteroanastomosis, es una parte importante de un procedimiento que persigue la curación de: a) un estoma que no funcione; b) úlcera péptica secundaria cerca ó en el estoma; c) fistula gastrojejuno cólica.

Se enumeran los factores que influyen en el manejo de estos casos y sus principios. Se discute la selección de los procedimientos y su relación a dos casos reportados. Se describen los porryenores de la degastroen teroanastomosis y del método de Pfeiffer envarios tiempos para el tratamiento de las fistulas gastrojejuno cólicas.

A certain amount of emphasis has been placed on the agglutination of the organism by the patient's serum, *e.g.* Castellum (1912), but the positive result obtained with over 50 per cent of Wassermann sera invalidates agglutination as a criterion of pathogenicity.

If the organism be isolated from the blood, the urine etc., it is of course correct to regard it as a pathogen, just as *B. coli* is pathogenic outside the intestinal tract, but the pathogenicity of *B. asiaticus* in the intestinal tract must either be regarded as nil, until definite intestinal lesions are shown to be caused by it, or the host of late lactose fermenting *coli* strains—including Sandiford's paracoli—must also be admitted to the status of aetiological agents in intestinal disease.

Since, then, there appears no legitimate reason why the "*B. asiaticus*" isolated from stools should not be regarded as a late lactose fermenting, sucrose fermenting *B. coli* both on biochemical and on serological grounds, there is no legitimate reason for retaining the specific name and description of *B. asiaticus*.

I have pleasure in thanking Dr L. J. John Orpen, M.B., D.P.H., Acting Director of this laboratory, for permission to submit this note for publication, and Miss Bendle, B.Sc., Miss Berry, and Mr Myers for technical assistance.

REFERENCES

- | | | |
|-------------------------------------|------|---|
| BARNETT, M. M. | 1936 | this <i>Journal</i> , xli 141 |
| BURGH, D. H. | 1910 | A manual of determinative bacteriology, 3rd ed., p. 337. London |
| CASTELLUM, A. | 1912 | <i>J. Trop. Med. and Hyg.</i> , xi 102 |
| ILLWITZ, R. T. | 1926 | A manual of bacteriology, p. 348. London |
| SANDIFORD, B. R. | 1935 | this <i>Journal</i> , xli 77 |
| TORTON, W. W. C., AND WILSON, G. S. | 1929 | The principles of bacteriology and immunity, vol. 1, p. 449. London |
| WILSON, G. S. | 1935 | Medical Research Council Spec. Rep. Ser., no. 206, p. 161. London |

616 95 616 36—002 951 22

HUMAN INFESTATION WITH *FASCIOLE HEPATICA*

J. H. BIGGART

Laboratory of the Scottish Asylums' Board and Departments of Pathology of the Royal Infirmary and University Edinburgh

(PLATE LI)

Whilst cases of human infection by the sheep fluke, *Fasciola hepatica*, have been reported in Venezuela, Argentina, France, Hungary, the Dardanelles and China (Faust, 1930), they are evidently very rare. Paul in a review of the subject in 1927, succeeded in collecting records of only forty-seven cases. The following report of human infestation with this fluke seemed, therefore, worthy of report.

The patient was a woman aged 36 years who had lived all her life in Scotland. There was no history of any previous illnesses. In April 1934

Studies of the Use of Glyco-Algin as a Solution for Transfusion

TANZO TAKAYAMA, M.D., F.I.C.S.*

SAPPORO, JAPAN

THE transfusion of fluids is administered mainly to achieve two ends: first, to restore the water deficiency of the body, and second, to supplement nutritional deficiencies. In addition, transfusion is employed to treat shock induced by severe trauma or major operations, and also as a blood substitute or an expander of plasma volume. In other words, various fluids are administered by transfusion to chronically dehydrated patients preoperatively, during operation and postoperatively, especially when the amount of blood required for transfusion is not available in cases of unsuspected great emergency and/or when various nutrients must be supplied.

Hitherto saline solution, Ringer's solution and 5 per cent dextrose have been commonly used to restore body fluids. It has been revealed recently, however, that a limit exists to the amount of fluid administered and that saline solution causes a disturbance in water metabolism, influences the electrolyte balance and, above all, may be the cause of pulmonary edema and other dangerous complications. To counteract these, Darrow's solution, Dextran and other medicaments have been introduced. Nevertheless, the problem of fluid transfusion has become more urgent with the progress of operative technic and the increase in the number of operations performed.

With the foregoing facts in mind, I have made chemically pure Glyco-Algin from sodium alginate, to be used in transfusions for dehydration, as a blood substitute and as a so-called plasma volume expander (Bowman).

These studies were begun in 1948 and completed in 1951.

Chemical and Biologic Properties of Sodium Alginate: Alginic acid, a polymer of a mannuronic acid, is chemically a polysaccharide and has a high molecular weight. Sodium alginate has a colloidal property, is soluble in water and has high viscosity. The structure of alginic acid is shown in Figure 1.

Glyco-Algin is prepared by dissolving 0.3 per cent sodium alginate in 5 per cent dextrose solution. It is adjusted to maintain a specific viscosity of 2 and a molecular weight of 15,000. This is because polysaccharides of high molecular weight, such as Dextran, have an unfavorable influence on the living body; moreover, solution of sodium alginate alone has been verified as having a somewhat ill effect on hemotasis.

When mature rabbits were bled at the rate of 20 cc. per kilogram of body weight in six minutes, the blood pressure dropped rapidly. With the systolic pressure at 100 prior to bleeding, the changes of blood pressure appeared as in Figure 2. The rabbits were then given transfusions of Ringer's solution, dextrose solution, alginate saline solution and Glyco-Algin respectively, in an amount equal to the blood removed, and the results compared with data on groups that received no transfu-

*Chief, Department of Surgery, Sapporo Medical School, Sapporo.

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.

Submitted for publication Sept. 12, 1956.



solution was tested by the Evans-Blue and Crandoll-Anderson methods.

The results are listed in the accompanying table and illustrated in Figure 4.

In the case of Ringer's solution, the circulating blood volume and especially the circulating plasma volume showed a marked decrease twenty minutes after the transfusion.

The reactions produced by dextrose were more or less the same. In my opin-

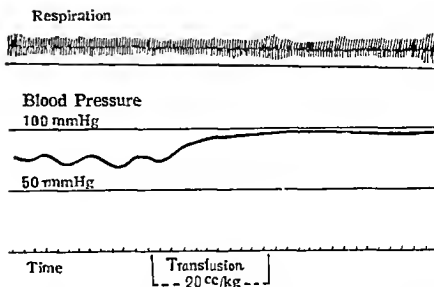


Fig. 3.—Effects of rapid intravenous transfusion

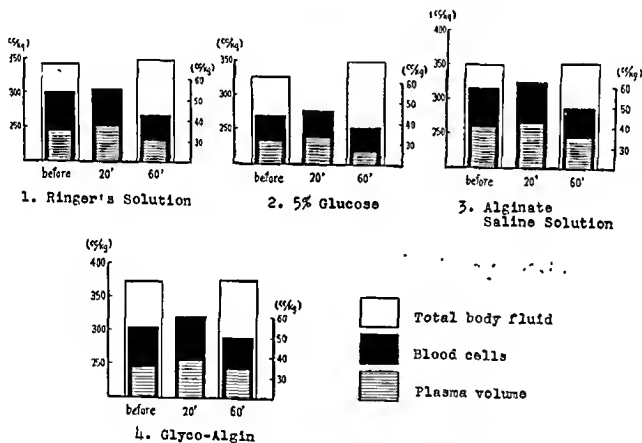


Fig. 4.—Effects on circulating blood and plasma volume.

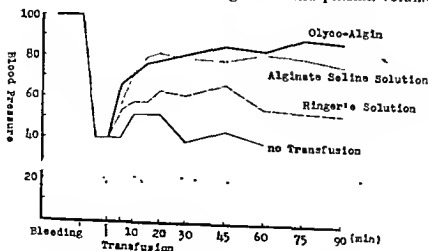


Fig. 5.—Effects of slow (drop) transfusion.

576 851 3 (V cholerae) 576 809 557

REGARDING ALLEGED TRANSMUTATION IN VIBRIOS

P BRUCE WHITE

From the National Institute for Medical Research, London

Round the vibrios there has grown up a legend of transmutability almost without parallel in bacteriological lore. It has been repeatedly alleged that vibrios of diverse source and nondescript serology have, in the laboratory, been observed to assume the serological *facies* of the classical cholera vibrio. Conversely it is claimed that typical *V. cholerae* may yield races no longer agglutinable with anticholera serum. Some of the descriptions in this second category doubtless refer to the degenerative phenomenon of roughening, some perhaps to reduction of agglutinability as distinct from modification of specific serology, but some claim a positive antigenic change. Opinion varies as to whether the recorded changes affect the genotype and involve the genesis or disappearance of *V. cholerae* proper or are superficial modifications of the serological phenotype.

Granting that mutative evolutionary changes must have occurred and probably do occur among vibrios, it is nevertheless to be vigorously questioned whether any of the claims to have observed such mutations have any basis in fact. The sceptic is in a difficult position in lodging his criticism: he is faced with the *fait accompli*, his failure to observe like mutations may be due to his ill luck or methods, he hesitates to challenge the observations of workers as earnest as himself. Yet the matter is fundamental and affects almost every aspect of the cholera problem from bacteriological diagnosis to epidemiological outlook. The theory of transmutability has been so directly expounded that it must either be admitted or countered by every legitimate argument. I venture to deal with two groups of recent observations: those of Linton and his co-workers in Calcutta (Linton, 1935, Linton, Shrivastava and Mitra, 1934-35) and of Taylor and Ahuja (1935-36 a and b) at Kasauli.

To summarise first the Calcutta observations. From a first plating of cholera stool two colonies were picked off yielding, respectively, a typical culture of *V. cholerae* termed "Rangoon smooth," and a vibrio race, termed "Rangoon rough 1," held to be a rough derivative of *V. cholerae* and showing no serological nor antigenic relationship with that organism. From "Rangoon rough 1" there was isolated a race, "Rangoon rough 2," growing in convoluted colonies and serologically distinct from "Rangoon smooth" and "Rangoon rough 1." Next there was separated from "Rangoon rough 2" a fourth race, "Rangoon rough 2a," described as smooth rough, serologically intermediate between "Rangoon smooth" and "Rangoon rough 2," and finally from this a fifth race, "Rangoon smooth recovered," in which the distinctive serology of *V. cholerae* was completely restored.

Through the kindness of Dr R. W. Linton I have been able to examine the cultures in question (with the exception of "Rangoon rough 2a") and have confirmed his description of their cultural and serological peculiarities.

The question of roughening in vibrios, with associated protein and carbohydrate changes, with which Linton and his co-workers were concerned, lies outside the scope of this note. Let it be said however that, in my opinion, "Rangoon rough 1" and "Rangoon rough 2" are normally smooth vibrios, each possessed of a distinctive smooth polysaccharide complex, their cultural

factors that may influence the problem of limitation of rapid transfusion.

These results were also verified by myocardiographic studies. While rapid transfusion adversely influenced the width of the myocardiogram, slow transfusion of 10 minims (Fig. 6) of Glyco-Algin, ninety minutes after bleeding, resulted in readings one and three-tenths as wide as those taken prior to bleeding, indicating efficient contraction of the heart.

The influence of Glyco-Algin transfusion on renal function is as follows:

1. Though the value for urine clearance increased gradually after transfusion of Glyco-Algin and returned to normal after twenty-four hours, the variation was within the normal physiologic range; hence it may be concluded that Glyco-Algin has no adverse influence on the kidney.

2. Though the output of urine decreases temporarily after bleeding, it gradually increases as transfusion is started slowly (10 minims; see Fig. 7) and is restored to normal after thirty minutes. In addition, a further increase was observed parallel with the transfusion of Glyco-Algin. When rapid transfusion was administered with alginate saline solution, anuria occurred after sixty minutes. Both Glyco-Algin and Ringer's solution tended to reduce the amount of urine, although a temporary increase was observed in the early stages.

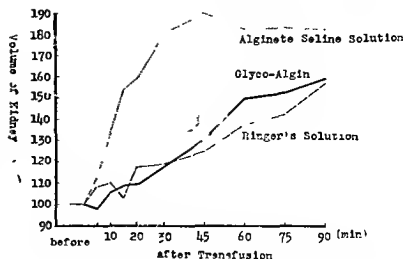


Fig. 9.—Enlargement of kidney with rapid transfusion.

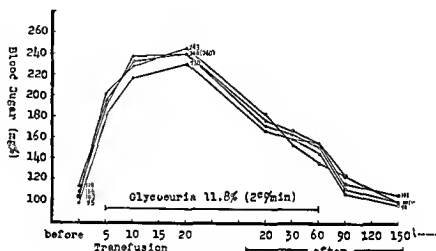


Fig. 10.—Effects on blood sugar level.

3. As to enlargement of the kidney, this was noted in all cases of transfusion. In the case of slow transfusion (10 minims) of Glyco-Algin a 10 to 20 per cent increase

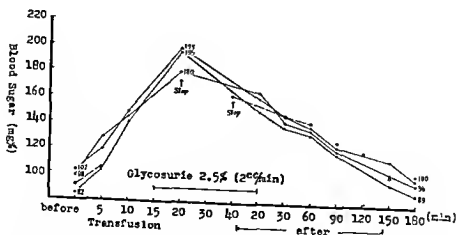


Fig. 11.—Comparative effects of Glyco-Algin and other transfusion fluids on blood sugar level in slow and rapid transfusion.

Various hypotheses may be improvised to fit the facts genesis of bacteriophage *de novo*, mutation of vibrio phage or vibrio phages unknown, collatorally with that of the vibrio itself, but the simple and obvious indication is that the alleged mutant cultures are not derived from the parents presented

There is, I believe, not only insufficient evidence on which to base a theory of vibronic transmutability such as is at present current, but definite evidence against acceptance of such alleged instances of change as have been discussed

REFERENCES

- | | |
|-----------------------|---|
| LINTON, R W | 1935 <i>Bull Off Int Hyg Publ</i> , xviii 1108 |
| LINTON, R W, SHRIVAS | 1934 35 <i>Ind J Med Res</i> , xvii 633 |
| TATA, D L, AND MITRA, | |
| B N | |
| TAYLOR, J, AND AHUJA, | 1935 36a <i>Ibid</i> , xviii 95 |
| M L | |
| " " | 1935 36b <i>Ibid</i> , xviii 531 |
| WHITE, P BRUCE | 1937 <i>this Journal</i> , lxv 276 |

Addendum Colonel Taylor, having read a draft of this communication, comments that, in stating his belief in the superficiality of the resemblance of the alleged mutants to *V. cholerae*, I have interpreted too freely his published views, that he actually stated that the mutants, while showing exact serological agreement with accredited cholera vibrios, showed, according to analyses made in Dr Linton's laboratory, no corresponding agreement in chemical (polysaccharide and protein) composition

618 14—006 46 616 41—006 46—033 2

CARCINOMA OF THE UTERUS OF THE RABBIT WITH SPLENIC METASTASES

C C TWORT

Cancer Research Department, University of Manchester

A female Dutch rabbit 7 years of age had been painted on the nape of the neck for four years with a 1 per cent solution in chloroform of a synthetic tar having a carcinogenic potency for mice of about half that of 1 2 5 6 dibenzanthracene. Painting commenced at the age of three months but was discontinued during the last three years of life. The first papilloma arose about nine months after the beginning of the tar applications, but neither this nor subsequent skin tumours became malignant, and they tended to disappear on the cessation of the tar applications.

At death there was found a tumour involving most of the uterus with secondaries in the liver, spleen, lungs and kidneys. The liver was most and the left kidney least affected. In the spleen there were four nodules, the largest the size of a small pea, while in the lungs there were milary nodules. Microscopically the tumour was found to be an undoubted adenocarcinoma, having a degree of malignancy not usually met with in this type of tumour of the rabbit. Scattered mitoses were in evidence throughout the metastases but were infrequent in the primary tumour, most of which had undergone septic necrosis, or where in the absence of sepsis the tumour found itself in an environment unsuitable to rapid growth.

was expelled into the urine. In contrast, when 1 cc. per minute was transfused, hyperglycemia was minimized and the occurrence of glycosuria was rare.

2. When Glyco-Algin was used in rapid transfusions the blood sugar content was slighter than with dextrose transfusion (Fig. 11), and the amount of dextrose expelled was only 2.5 per cent of the transfused amount, which is but one-fifth of the former figure. With slow transfusion of Glyco-Algin, no dextrose was observed in the urine.

As Dewes pointed out, it is well known that operations cause hyperglycemia accompanied by glycosuria. Since transfusions are frequently administered with operations, I have made observations on

the combined influences of operation and transfusion on carbohydrate metabolism.

In the operative experiments rabbits were used. In Group 1 bleeding was induced; in Groups 2 and 3 the stomach and small intestine were crushed; then transfusions were given to the three groups and the results compared.

With dextrose transfusions 50 per cent or more of the transfused amount was expelled; with Glyco-Algin only two-thirds was expelled and the increase in blood sugar was negligible as compared with that following transfusions of dextrose solution. In spite of the fact that Glyco-Algin is a solution of sodium alginate and 5 per cent dextrose solution, it provides more desirable effects and is utilized to a fuller

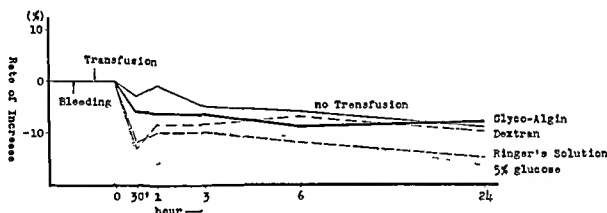


Fig. 14.—Effects of various supplementary fluids on hemoglobin content of blood.

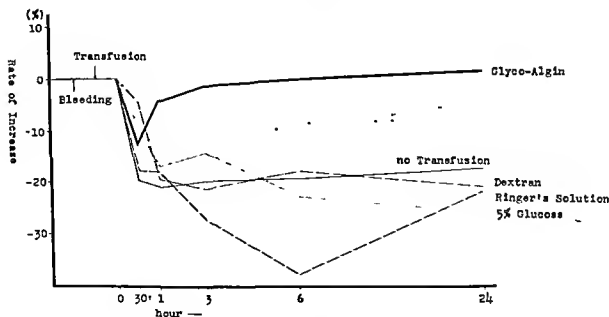


Fig. 15.—Effects on total hemoglobin volume of blood.

laboratory and he was offered a demonstratorship in pathology before he passed his final examinations. In 1907 he was admitted to the M.B., B.S. degrees of the University of London and began work in the laboratories at St Mary's Hospital. While still a student he had acted as a temporary house surgeon at the French Hospital where he met J. A. Murray. Here began a friendship which was to influence his life's work, for from Murray Kettle got his first interest in the problems of cancer research. In 1908 he accepted a post offered to him by Alexander Paine in the new laboratory of the Cancer Hospital. In 1911 he worked with Aschoff in Freiburg and in 1912 he returned to St Mary's where during twelve years he held successive posts as first assistant pathologist to the Hospital and assistant lecturer in pathology to the Medical School, as joint pathologist to the Hospital with Bernard Spilsbury, as pathologist and lecturer in pathology and, ultimately, as director of general and special pathology in the Institute of Pathology and Medical Research. Disappointed on several occasions during the War when on account of his stiff knee his applications to join the R.A.M.C. were refused, Kettle added to his laboratory duties the clinical work of a hospital, the staff of which had been depleted by the claims of active service. For a time he combined the duties of resident obstetric officer with those of pathologist. In 1916 he was invited to superintend the laboratory of the 3rd London General Hospital where he spent his mornings, while his afternoons and evenings were occupied at St Mary's. The first edition of his book, *The pathology of tumours*, appeared in 1916. In many ways this small book is characteristic of its author's work. It is short but contains a clear and sufficient account of the then state of knowledge. Written on the sound basis of the author's own experience, it makes a handy work of reference for pathologist and teacher. To generations of students it has made a strong appeal, for students are the first to appreciate a book which is clearly and plainly written and contains no irrelevant matter. The illustrations drawn by Kettle's own hand are not the least attractive feature of the book. For St Mary's and its medical school Kettle felt a deep loyalty and affection, and as the men began to come back after the War his laboratory became more and more a centre of activity and friendship. During twelve years at St Mary's, Kettle laid the foundation of what was to become an exceptionally wide and thorough knowledge of pathology. He made and established a reputation as a teacher and began to show those personal gifts for helpful friendship which had so deep an influence on his colleagues and on all who came in contact with him. During the latter part of his time at St Mary's, he reorganised the teaching of pathology, arranged that senior students should take a responsible share in the routine work of

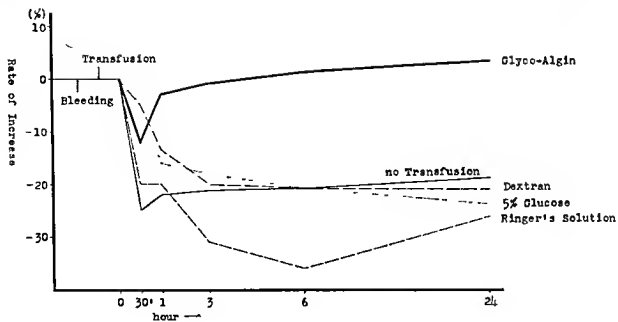


Fig. 16.—Effects on erythrocyte count.

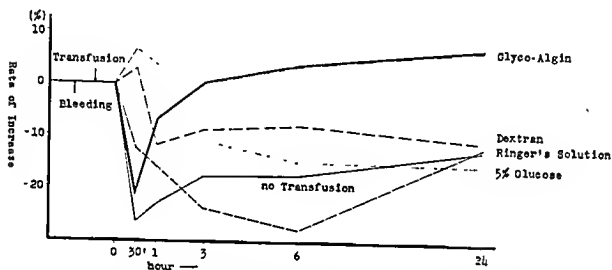


Fig. 17.—Effects on total protein content of blood plasma.

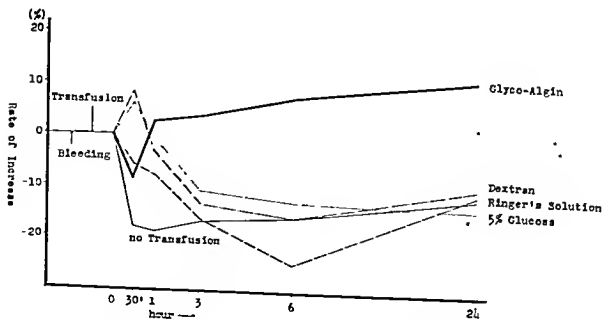


Fig. 18.—Effects on total circulating blood volume.

hospital medical schools of London. He felt that their departments of pathology had hitherto had no chance to bring the standard of undergraduate knowledge in this subject to the level reached in the schools in the provinces. The development of the schools in London was largely responsible for this. The honorary staffs of the clinical departments had the preponderant voice in the management of the schools, pathology was regarded as an aid to clinical practice, and provision for its staff and laboratory accommodation was limited by the close application of the subject to the practice of medicine. During the years Kettle was at St Bartholomew's he strove to widen the scope of teaching in pathology and to utilize it as a means of scientific education. He found the department staffed to a large extent by young clinicians, who spent a very few years in the department before returning to clinical work, and though he fully recognized the value of such a training for the clinical staff it was his constant endeavour to obtain as members of his staff men who intended to follow careers in pathology. He reorganized the teaching so that the students should have as much help as possible from pathology at the outset of the clinical period and also during their years in the wards, for he believed firmly in the continued instruction in pathology during the final years of the curriculum."

Kettle went about the task which he had set himself the realisation of his own ideals in teaching and research, with the mixture of modesty and determination which was one of his chief characteristics. His enthusiasm for his job, his mastery of his subject, his readiness to give his best in all which he undertook won the confidence, support and affection of his colleagues. He soon found himself at home in his new surroundings and the years which he spent at St Bartholomew's proved to be the happiest as well as the most fruitful of his career. The many-sided duties of a pathologist in a great medical school provided Kettle with opportunities for the exercise of his gifts. His wide knowledge and experience of pathological processes found full employment in the daily work of the laboratory. His interest in the great problems of pathology, his belief that their solution must be sought by experiment, never closed his eyes to the value of the lessons which could be learnt from the observation of disease in man. In his laboratory he gathered around him young men interested in pathology to whom he gave encouragement, advice and criticism, phrased in his own fashion, with some jest or odd use of words. He took joy in his work and his happiness found expression in quaint words so that his sayings were not easily forgotten.

The duties of a pathologist to a great hospital and a teacher in a large medical school leave little time for original research, but

that Glyco-Algin is invariably satisfactory, without one exception. It is also inexpensive. In my surgical clinic alone, 15 to 20 liters, equivalent to 30 or 40 bottles, of Glyco-Algin are used every day.

RÉSUMÉ

La "glyco-algine" est sous tous rapports une solution de transfusion quasi idéale: elle augmente et équilibre de façon satisfaisante la pression sanguine, elle reconstitue et maintient le volume circulatoire du sang et du plasma, et stabilise le volume des urines et le métabolisme des hydrates de carbone.

ZUSAMMENFASSUNG

Das Glyco-algin ist eine in jeder Hinsicht ideale Transfusionslösung, da es zu einer ausreichenden Erhöhung des Blutdruckes führt, den Blutdruck auf gleicher Höhe erhält, das Volumen des zirkulierenden Blutes und Plasmas wiederherstellt und erhält und die Urinausscheidung und den Kohlehydratstoffwechsel stabilisiert.

RESUMEN

Glyco-Algin es, desde todo punto de

vista, una solución para transfusiones casi ideal, ya que aumenta y mantiene la presión arterial satisfactoriamente; restaura y mantiene el volumen circulante de sangre y plasma y estabiliza el volumen de orina y el metabolismo de los carbohidratos.

RIASSUNTO

Sotto ogni punto di vista la Glicoalgina è la migliore soluzione per infusioni in quanto aumenta e mantiene in maniera soddisfacente la pressione del sangue, ripristina e mantiene il volume del sangue circolante e del plasma, e stabilizza il volume di urina e il metabolismo dei carboidrati.

SUMARIO

O "Glyco-Algin" é, em todos os aspectos, um soluto quase ideal para transfusão, porque aumenta e mantém satisfatoriamente a pressão sanguínea, restaura e mantém o volume sanguíneo circulante, o plasma e estabiliza o volume urinário assim como o metabolismo dos carboidratos.

There is a strength of body that comes from strength of soul, and this is genuine.
There is a strength of soul that comes from strength of body, and this is spurious.
—Zangwill

work will live after him in his own contributions to pathology, and in the lives and output of those men and women he started on their way. They learnt from him a good deal of pathology, a good deal of kindly wisdom, and much of the value of friendship, and of the power of a man's courage."

In the minds of pathologists Kettle's name is associated with two chapters of our science, with tumours and with the effect of dust on infection and resistance. His papers on tumours reflect an eager interest in minute anatomy and a nicely balanced judgment based on accurate observation. They contain careful accounts of tumours which had passed through his hands and are illustrated by accurate drawings. He was an admirable histologist and he was convinced that, even in the well worked field of the histology of tumours, there were advances yet to be made by accurate observation and critical deduction. From his early days at the Cancer Hospital he derived and maintained a keen interest in the progress of cancer research. He appreciated the value of the study of tumours grafted or produced experimentally in animals, but understood that the full value of animal experiments was realised only when the results were compared with the findings in the human body. He realised that the skilled use of the microscope could be as useful in the interpretation of the results of experiment as in the diagnosis of human material removed by operation. In a paper published in 1919 Kettle wrote "all cancer research must ultimately rest on a histological basis" and "it is of the greatest importance to correlate with human pathology the results of experimental research. But for any work along these lines to be fruitful, it is essential that it should rest upon a sure foundation of wide and accurate histological knowledge."

His papers on the endotheliomata are for the most part descriptive but are evidence of accurate observation and critical judgment. His book is a clear and concise account of the most important characters of the commoner tumours. The illustrations are admirable because Kettle knew what he was drawing and drew just what he wanted to display. In 1919 he wrote as an appendix to a Medical Research Committee Report a short account of the histopathology of gas gangrene. In this paper are set out the lines on which an investigation of the characteristic changes associated with a specific infective agent should be investigated and recorded. In 1922, Kettle with W. E. Gye published the results of experiments on mice injected with silica, with tubercle bacilli and with both bacilli and silica. Up to that time it had been assumed by most people that the injurious qualities of silica depended on its great hardness and insolubility. Gye and Kettle not only pointed out that silica is readily soluble in alkali and in the presence of living matter but suggested that the poisonous action of silica

method often used earlier, i.e., "pulling the urethra" through a canal made in the glans, with a pointed scalpel, originated with Thompson-Walker. Today hypospadias glandis can be cured by the creation of a new urethra. All operations aiming at correction of the original urethra by pull-through or relocation are obsolete, because no improvement is thereby made in the deformity of the penis.

A brief summary of the development of the hypospadias therapy and a description of a new method of operation, in which the urethra is replaced by means of transplantation of the mucous membrane of the bladder.

History.—Nove-Josserand, in 1897, used scrotal grafts for replacement of the deficient urethra. He used Thiersch graft lobes, which he transplanted into a canal of the pars pendula prepared in advance. About 1900, surgery made sensational progress in the field of tissue plastics. What was virtually a race, aiming at the best substitute for the deficient urethra, began at once. Creevy stated that scrotal skin was unsuitable for making a urethra, since hair grows into it, forming stones. Edmund then used skin from the prepuce, with success. Nesbit and also Davis used the skin from the dorsum of the penis, which they transplanted to the ventral surface. Some surgeons used skin from the penis as well as from the scrotum. Many satisfactory results were obtained, since the skin in this region is hairless, pliant and elastic. The use of pedicled skin grafts from the surrounding skin was attempted, but this was soon given up, since the skin of the prepuce was more easily available. Russell formed a tunnel of the skin of the prepuce and later pulled the glans through.

Free transplantations, which at one time were performed frequently, have been dropped altogether. A great many experiments have been made to transplant

entire cavernous organs, such as the appendix, the ovarian tubes, or a vein; skin also has been used for making a new urethra, as well as Thiersch's lobes and the vagina. Good initial results were obtained with all this material, but this kind of transplant was absorbed and replaced with scar tissue. Masson used Thiersch's lobes with some success but encountered many failures due to disruption of the transplant by coagulated blood. Schieden, in 1919, was the first to use the urethra from another human being. Lexer, in 1911, made use of the appendix. In 1910, Tanton attempted to use a vein for transplantation and Legueu experimented with the *mucous membrane of the vagina*. He succeeded in making a canal but abandoned the method, as the vagina could not be adapted to the constitution of a urethra. All attempts at using extraneous material are doomed to failure since such transplants are biologically intolerable.

The most common operations used at present include:

Hamilton Russell's "stole" operation. This is performed in four stages, in which an incision is made through the frenum that binds down the penis, and the glans is tunneled with a tenotomy knife. Incisions are then made laterally in two lines; a strip of prepuce like a clergyman's stole is thus marked out, and finally the flaps forming the urethra are sutured. Davis uses the skin from the dorsum of the penis and adds the prepuce if needed. Ombredanne's operation is recommended by some surgeons. Bidder incises the ventral aspect of the penis on both sides, forming the urethra from the skin of the penis and the floor from scrotal skin. This operation is adequate for peniscrotal hypospadias. Denis-Browne uses the skin of the penis, which is supposed to possess, among other advantages, the quality of not forming keloids. In addition, he uses the skin of the prepuce. A perineal ureth.

with disease as it occurs in man. He was keenly interested in the industrial manifestations of silcosis and other dust diseases and he was able to interest mining engineers, industrialists and all people connected with dusty trades in the practical outcome of his experiments. The lecture which he gave in 1934 to the Institution of Mining and Metallurgy may be read with profit by a pathologist but is so clearly phrased in language free from technical nomenclature as to present to the lay reader a simple account of the dust problem and its relation to disease. That this lecture was understood and appreciated is clear from the enthusiasm with which it was received. An onlooker records that the audience "nearly mobbed Kettle in their excitement at having for the first time understood the problem of silcosis."

Another and an excellent summary of Kettle's views on the relation of dust to infection is given in his Presidential Address to the Pathological Section of the Royal Society of Medicine.

Towards the solution of dust problems Kettle provided two admirable methods. In 1924 he adapted the principle of the "fixation abscess" to the study of the relation of silica to tuberculosis. If localised inflammatory lesions were produced in mice and rabbits and the animals were subsequently injected intravenously with tubercle bacilli, the increased vascularity made the inflamed areas more liable to infection. Calcium chloride and turpentine were not very effective localising agents but if the fixation abscess was produced by silica, the tubercle bacilli proliferated to a remarkable extent.

In 1932 Kettle published with R. Hilton a paper on the technique of experimental pneumoconiosis. For the production of pulmonary lesions almost all workers had exposed animals for months and years in rooms or boxes in which a dusty atmosphere was maintained by some mechanical device. The inhalation method is expensive to maintain, a large proportion of the animals die before the experiment has been completed and years may elapse before results are obtained. Kettle and Hilton injected suspensions of dusts in salt solution directly into the trachea of rabbits and guinea-pigs. The mortality from the procedure was small, and excellent results were obtained with a minimum of labour and within a relatively short time. The method of intratracheal injections enabled Kettle to test a large variety of dusts on a comparatively small number of animals and in a comparatively short time.

His last published papers were concerned with the relation of various dusts to tuberculous infection. He returned to the "fixation abscess" method and compared the action of various silica-containing dusts, such as mine dusts from the Rand, shale,

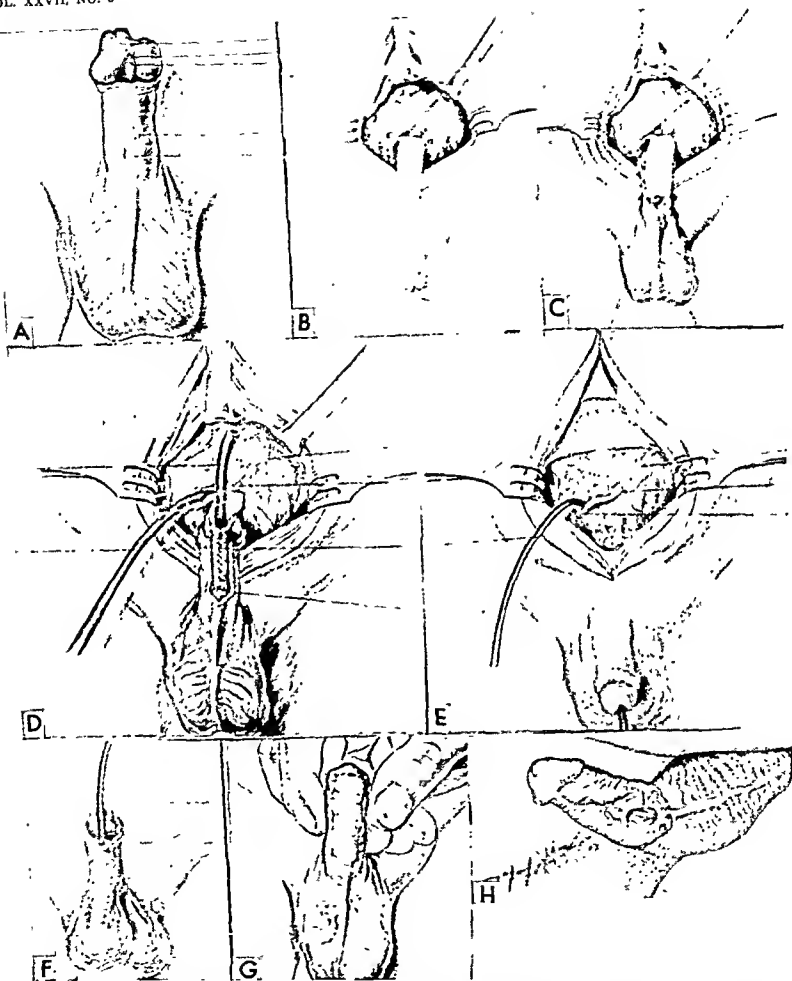


Fig. 1.—A to H inclusive, Case 1. Appearance of hypospadias and fistulas in boy aged 7. B, bladder prepared; pedicled flap folded down to penis. C, penis turned upward; graft sewn onto defect. D, graft formed into tube around rubber drain and duly sewn. E, graft cut off, leaving only catheter in bladder; penis turned downward. F, penis turned upward for demonstration. New urethra covered by graft taken from scrotum. G, hypospadias cured. H (Case 2) walnut-sized hypospadias in an adult; scar from high section; many scars around the hypospadias.

British Universities to give evidence before a Committee of the House of Lords on the "Osteopaths Bill"

As an examiner he was much in request, for he had examined in the Universities of London, Oxford, Cambridge, Glasgow, Wales and Bristol and at the Royal Army Medical College. Wherever there was work to do, whenever a sound opinion was wanted, Kettle received an invitation. He was always willing to put his knowledge and experience at the service of those who needed it and was as pleased to help a junior colleague as a government department.

The distinctions which came to him gave him real pleasure which was intensified by the knowledge that his friends were pleased. In the *St Mary's Hospital Gazette*, Dr Reginald Miller wrote, "As promotions and honours came to him, his wide circle of friends felt that they were not only proper but were an occasion for happiness to them all, and even now that he has gone from us his memory leaves us heartened and gladdened."

Kettle was elected a member of the Pathological Society in 1910, of its committee in 1923 and treasurer in 1928. In committee his wisdom and experience were of service in the direction of the Society's affairs. He could and did take a firm line on those occasions when he felt that some important principle was involved. When he did take part in controversy his arguments, garnished as often as not with some quaint word or phrase, seldom failed to disarm an opponent. As Treasurer he conducted the affairs of the Society with quiet efficiency. He came regularly to our meetings. Much of the best of his work was communicated first to our Society and if his contributions to debate were short, they were very much to the point. At the meetings of our Society his comradeship and quiet but happy humour will be long remembered. In the demonstration room, in the corridor, wherever members met together to talk, Kettle was to be found and generally the centre of a group of friends. We wanted his opinion, often about a rare specimen, sometimes about some problem of the medical curriculum, or of laboratory management. Often the talk was of none of these things. Not the least of Kettle's qualities was his capacity for friendship. He knew men and understood them, and his understanding made him generous in appreciation of a friend's achievement and sympathetic with his failure. The affection in which his friends held him was due to their confidence in his knowledge of them. In times of difficulty he was able to help because he could see the problem from his friend's point of view.

By his work and by his teaching Kettle made a place among pathologists which will be hard indeed to fill. In his own laboratory, in our Society, in all places where pathologists assemble, his wisdom

from the former urethra and the new vesical graft, a graft was taken from the scrotum to cover the new urethra and was sewed onto it. (Fig. 1E). When the bladder healed, it was necessary to put a catheter into the newly formed urethra. As a result of this, urethritis and pain occurred; it was obvious that the child could not tolerate a catheter, so a "boutonniere" was created and the catheter removed from the urethra. Through this passage undisturbed healing occurred and the final result was satisfactory (Fig. 1G). The boy has been under observation for a long time and urinates in a good stream without difficulty. Dilatation of the urethra was performed without difficulty, and no stenosis or stricture has occurred in seven years.

It was my impression at first that this operation was suitable only for children, in view of the fact that changing states of fullness of the corpora cavernosa would disturb such a plastic procedure. Successful results, however, have been obtained in 2 adult patients. The case of 1 of these is here reported.

CASE 2.—A 34-year-old man was admitted to hospital with a history of gonorrhea ten years earlier, followed by prostatic abscess that ruptured into the rectum during an examination with the patient under anesthesia. Both urine and feces had been diverted from their natural passages. In addition to the fistula between the rectum and the bladder, there was hypospadias of the pars pendula of the penis (Fig. 2A). Many operations had been done to close the hypospadias, but without success, so that when I first saw the patient the whole penile section was transformed into thick scar tissue, with the large hypospadiac opening of the urethra (Fig. 2B).

Operative Technic.—The rectovesical fistula was first repaired by cutting circularly around the anus, the incision penetrating in all directions into the periproctytic tissue. The rectum was freed and the sphincter isolated. The rectum was brought out through the anus, so that the old scarred fistula in the rectum was placed exterior to the anus. The sphincter was sutured carefully around the rectum and the exteriorized portion cut off. (This was a modification of the Rothenegg operation.) A catheter was introduced into the bladder, and in about four weeks the rectum was completely healed. The hypospadias op-

eration was then performed in the manner described (Fig. 2, C and D). The patient was followed for eight years and has had no trouble with urination or with rectal complaints since the last operation. When he was last examined erection and ejaculation were normal, the urine was clear, urination with a good stream was habitual (Fig. 2, E and F). Periodic dilation was done after the operation.

COMMENT

The mucous membrane of the bladder has been used as a transplant in the cure of hypospadias because of the good nutrition of the graft and its physiologic ability to conduct urine. It is not necessary, in this operation, to divert the urine through a perineal urethrostomy, but it is done through a cystostomy, which also has the advantage that the material for the graft is immediately at hand. There is no other organ so rich in mucous membrane, so elastic and so much inclined to heal easily as the bladder. Modern methods of operation take this quality into consideration. It is possible to extirpate much of the bladder and find, a few weeks later, that the walnut-sized remainder has become once more an organ of almost normal capacity. One should not hesitate, therefore, to cut large grafts from the anterior wall in order to obtain surplus material for a plastic operation. Although it is true the tubular graft material does not usually shrink—which is quite a contrast to what occurs with a free transplant—it is a good thing to suture without tension and to build the tube without a drain. The mucous membrane of the urethra and bladder will easily heal per primam, in view of the fact that they are cognate mucous membranes and do not have to perform any function that is new to them.

The nutrition of the graft is ample, so that there is no danger of necrosis. Severe purulent cystitis is a contraindication to this procedure, but mild cystitis or mild edema of the mucous membrane need not

- The technique of experimental pneumoconiosis, (with R. Hilton) *Lancet*, 1932, i 1190
- Observations on the pneumoconioses *Brit Med J*, 1932, ii 281
- The differential diagnosis of tuberculo silicosis, (with H. E. Archer) *Proc Roy Soc Med*, 1932 33, lxxvi 811
- Experimental pneumoconiosis infective silicosis this *Journal*, 1934, xxxviii 201
- The detection of dangerous dusts *Lancet*, 1934, i 889
- The pathology of peptic ulceration *St Bartholomew's Hosp Rep*, 1934, lxxvii 18
- The action of harmful dusts *Trans Inst Mining and Metallurgy*, 1934, xliii 471
- The etiology of malignant disease *St Bartholomew's Hosp J*, 1934 35, xliii 101
- Contribution to a discussion on silicosis in British coal mines *Trans Inst Mining Engineers*, 1934 35, lxxxviii 391

Oskar Klotz.

1878-1936

(PLATE LII)

OSKAR KLOTZ, professor of pathology and bacteriology in the University of Toronto, Canada, died on 3rd November 1936, in his 59th year. Myelogenous leukaemia was the cause of his death. He was born at Preston, Ontario, on 21st January 1878, the son of the late Dr Otto Klotz, director of the Dominion Observatory. Graduating in 1902 with an M.B. degree from the Faculty of Medicine, University of Toronto, he was house physician and superintendent in hospitals in Ottawa until the autumn of 1903, when he joined Professor J. George Adams at McGill University, Montreal, as Governor's Fellow in pathology and later held a Fellowship from the Rockefeller Institute. In 1906 he received the degree of M.D., C.M. from McGill and during this period in Montreal held a number of positions in the department of pathology and in various hospitals of the city. In 1905 he studied at the University of Bonn, in 1908 at the University of Freiburg, and in 1914 at the University of Marburg. In 1909 at the age of thirty-one he accepted the chair of pathology and bacteriology in the reorganised medical school of the University of Pittsburgh, and during the following eleven years he developed a strong department and firmly established pathology in that community. In 1921 he went, at the invitation of the International Health Board of the Rockefeller Foundation, to Brazil as professor of pathology in the University of Sao Paulo, where he remained

sas operaciones sin éxito. En ambos casos el autor está particularmente convencido de que su método garantizaría el éxito, ya que es fisiológico. Muchos otros métodos tienen la desventaja de emplear tejidos que deben adaptarse al transporte de orina, lo cual se ha comprobado imposible frecuentemente.

BIBLIOGRAPHY

- Axhausen, G.: Berlin klin. Wchsnschr. 55:1065, 1918.
 Beck, C.: New York State J. Med. 70:212, 1899, and 72:969, 1900.
 Blair, A.: Ann. Surg. 85:391, 1927.
 Browne, D., cited by Boshamer, K.: Ztschr. f. urol. 45:396, 1952.
 Buckwall, R. T.: Lancet 2:887, 1907.
 Cabot, H.: Treatment of Urology, 1941.
 Cantas, A.: Lyon chir. 5:250, 1911.
 Cecil, A. B.: Cited by Cabot.
 Cecil, H.: Surgeons 24:253-302, 1931.
 Creevy, C. D.: In Campbell, M.: Urology, 1954, pp. 2082-2085.
 Culp, J.: Cited by Campbell.
 Davis, D. M.: Surgeons 33:221-235, 1940.
 Dodson, A. I.: Urological Surgery. St. Louis: The C. V. Mosby Co., 1943, p. 533.
 Duplay, S.: Cited by Cabot.
 Edmund, C.: Lancet 1:684, 1926.
 Frangenheim: Handbuch der Urologie. Berlin: J. Springer Verlag, vol. 2.
 Hagner, F. B., and Keale, H. B.: Tr. Am. A. Gen.-Urin. Surg. 15:11, 1927.
 Legueu, A.: J. Urol. 2:369, 1918.
 Lexer, E.: Verh. deutsche Ges. f. Chir. 40:386, 1911.
 McGuire, S.: Ann. Surg. 85:391, 1927.
 Marion, G.: J. de Urol. med. & chir. Paris 14: 473, 1922.
 Masson, I. C.: Coll. Papers Mayo Clin. 10:608, 1918.
 Mayo, C.: J.A.M.A. 36:1157, 1901.
 Mettauer, I. B.: Am. J. M. Sc. 4:43, 1942.
 Nesbit, R. M.: J. Urol. 45:696, 1941.
 Nove-Josserand, G.: Lyon med. 85:196, 1897.
 Ombredanne, L.: Bull. et mem. Soc. de chir. Paris 38:1457, 1912.
 Patel, G., and Leriche, R.: Presse med. 27:727, 1909.
 Pettit, I. L.: Arch. gen. de med. Paris 1:513, 1874.
 Pousson, E.: Ztschr. f. Urol. 8:440, 1914.
 Rosenstein, P.: Ztschr. f. Urol. 23:627, 1929.
 Rosser, C.: Ann. Surg. 85:391, 1927.
 Russell, H.: Brit. M. J. p. 1432, 1900.
 Schmieden, V.: Arch. f. klin. Chir. 90:748, 1909.
 Shawan, H. K.: Am. J. M. Sc. 149:503, 1915.
 Stettiner, H.: Handbuch fur Urologie, 1929.
 Streissler, S.: Verh. d. Deutschen Ges. f. Chir. 40:311, 1911.
 Tanton, P.: Bull. Soc. de chir. Paris 6:597, 1910.
 Thompson-Walker: Lancet 1:790, 1920.
 Trout, H.: Am. Surgeon 85:391, 1927.
 Unger, W.: Zntribl. f. Chir. 13:84, 1909.
 Walter, W., and Counsellor, F.: J. Urol. 33:400, 1935.
 Weitz, W.: Deutsche med. Wchsnschr. 32:888, 1919.
 Young, H. H.: Practice of Urology, 1926.

The longer I live the more it pains me to see man, who occupies his supreme place for the very purpose of obtaining a command over nature and freeing himself and his fellow-creatures from the violent force of necessity,—to see him, influenced by some preconceived and false notion, doing just the opposite of that which he wants to do; and then, because his whole design has been marred, bungling miserably over everything.

—Goethe

many of the complications encountered in the past should be lessened. General anesthesia seems to have definite advantages over local anesthesia with regard to complications.

In 1952, Abbott, Gay, and Goodall⁵ reported the complications in 174 cerebral arteriographic procedures. Most of these were of cerebral vascular origin, with temporary or permanent hemiplegia, aphasia, hemianopsias, convulsions and even death. Extracranial complications were cervical hematoma necessitating tracheotomy, severe irritation of the soft tissue, with fever and pain, hoarseness, transitory diffuse punctate hemorrhages of the face and neck and radiculitis of the cervical roots (from the taking of a vertebral arteriogram). Horner's syndrome, temporary and permanent, was occasionally encountered. The authors considered the complications due to mechanical factors, vasospastic factors, disturbance of the blood-brain barrier, air or blood clot embolism and sensitivity to drugs. Hypaque has not been used long enough to justify evaluation of the complications it may cause, and the extracranial complications should be essentially the same; the more serious cerebral complications, however, should be encountered less often.

With better angiographic technic aiding

in the diagnosis of intracranial aneurysmal lesions, improved surgical methods have necessarily followed. Better surgical technic, careful selection of patients and the time of operation, and hypotensive anesthesia have all helped lower surgical mortality and morbidity rates. As time goes on, experience with the management of these lesions will certainly lead to many more cures.

Saccular intracranial aneurysms may be grouped, according to location, into those of the infraclinoid part of the internal carotid artery, those of the supraclinoid part of the internal carotid artery, those on or about the circle of Willis, those of the peripheral part of the major cerebral vessels and those in the posterior fossa. The arteriovenous malformations will be briefly discussed.

The symptoms and treatment of these saccular aneurysms vary with their various sites and will be discussed according to location.

Infraclinoid Aneurysms of the Internal Carotid Artery.—Infraclinoid aneurysms of the internal carotid artery occur on the cavernous part of the artery. These aneurysms are usually large, saccular lesions, causing symptoms because of compression of the adjacent structures or by rupture into the cavernous sinus, produc-

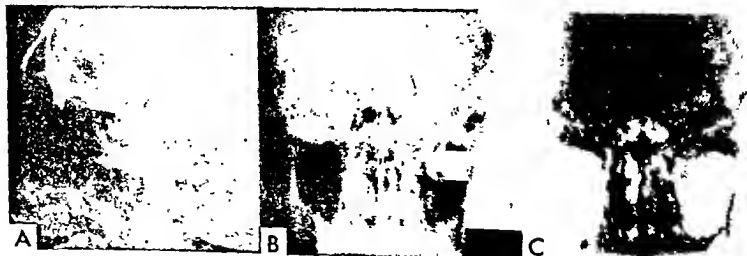


Fig. 1 (Case 1).—A, arteriogram showing arteriovenous fistula between intracranial carotid artery and cavernous sinus. (Note large amount of dye in the region of cavernous sinus and dilated ophthalmic vein.) B, left carotid arteriogram showing dye in cavernous sinus (lateral view). C, normal right cerebral arteriogram of same patient for comparison.

hyperplasia of the intima, he himself was much interested in diseases of the media of arteries and was largely responsible for the introduction of the concept of "medial arteriosclerosis". Diseases of the media formed the subject of a long monograph published in 1911, while later publications dealt in further detail with the medial lesions associated with rheumatic and syphilitic infections and the changes responsible for the occurrence of aneurysms and spontaneous ruptures of the aorta. Arteriosclerotic lesions affecting the intima likewise attracted his attention. He was especially interested in arteriosclerosis of the coronary and renal arteries and made numerous contributions to the literature of coronary sclerosis and cardiovascular renal disease. His experimental studies of earlier years strongly influenced his ideas on the aetiology of arteriosclerosis and he constantly supported the view that infections, intoxications and overwork with consequent fatigue of the arterial musculature were aetiological factors of first importance. His masterly discussion of arteriosclerosis before the meeting of the American Association of Pathologists and Bacteriologists in Toronto in 1934, and the exhaustive review of experimental arteriosclerosis presented before the International Society of Geographical Pathology in Utrecht in the same year, formed together a fitting climax to a life-time of research on diseases of the arteries.

During the last fifteen years of his life he became attracted by the problems of tropical diseases but particularly those of yellow fever. During his stay in Sao Paulo, Brazil, in 1921-1923 and as a special member of the Yellow Fever Commission of the International Health Board of the Rockefeller Foundation in Nigeria, West Africa, in 1926 and in 1928, he came in intimate contact with all phases of yellow fever and took a prominent part in its scientific study. He was probably the leading authority on the pathological diagnosis of the disease in man and animals and the evidence he collected established the identity of the yellow fever of West Africa with that occurring in America. The West African studies eliminated as causative agent any visible micro-organism and the endeavour was made to discover a susceptible animal other than man for experimental purposes. Having failed to find such in West Africa his suggestion that wild animals from countries free from yellow fever be investigated led to the brilliant results which established the virus nature of the disease.

He was associated with a number of great men in medicine, Adams, John McCrae, H. Ribbert, H. Chiari, Jores, Bernard Fischer, Aschoff and others.

Dr Klotz was a stimulating and inspiring teacher who gave unsparingly of his time to students, research workers and all the members of his staff. He had an exceptional fund of energy and was decisive and clear thinking, so that he gave to all that sense



Fig. 2 (Case 3).—A, roentgenogram of skull showing erosion of sellar region and abnormal calcification caused by large aneurysm. B, large aneurysm of left internal carotid artery.

drostatic pressure and pulsatile action. They concluded that systolic thrust is greatly diminished by ligation and that this accounted for the satisfactory results.

Hamby,¹⁴ in a recent report, stated that he has limited his cervical ligations to infraclinoid aneurysms.

The following 3 cases are representative of aneurysms on the internal carotid artery in the cavernous sinus. In Case 1 a traumatic arteriovenous fistula was treated and cured by ligation of the internal carotid artery. In Case 2 an unruptured aneu-

rysm of the cavernous sinus was present, producing palsy of the third nerve, with pain in the forehead. This aneurysm was treated by ligation of the common carotid artery, with temporary relief of pain for a week. A clip was then applied intracranially on the internal carotid artery with complete relief of pain and palsy of the third nerve. In Case 3 there was an aneurysm of the cavernous sinus that produced pain in the area of the second division of the trigeminal nerve, in addition to longstanding palsy of the sixth nerve. The



Fig. 3 (Case 4).—A, large aneurysm, supraclinoid part of internal carotid artery (lateral view). B, anteroposterior view. C, postoperative film showing clip on internal carotid in neck and clips on internal carotid intracranially.

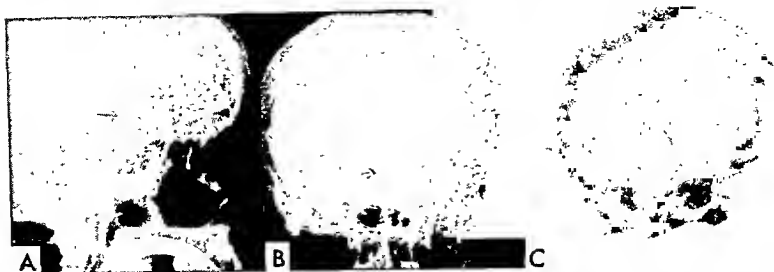


Fig. 5 (Case 6).—A, right arteriogram showing aneurysm of anterior communicating artery. B, anteroposterior view. C, oblique view.

days after the arteriographic investigation, with complete relief of pain. There was no further drooping of the eyelid, but the inability to abduct the left eye persisted. This patient was seen one year after the operation. She had remained free of pain, but the abducens paralysis was still evident.

Supraclinoid Aneurysms of the Internal Carotid Artery.—Walker,¹⁵ in reviewing 285 cases of intracranial aneurysms, observed that 71 verified aneurysms of the internal carotid artery had occurred above the clinoid process. He noted that headache or pain in the head was the most common complaint and was present for periods varying up to many years before the development of a subarachnoid hemorrhage, which occurred in 46 of the 71 patients. Half of the patients who had subarachnoid hemorrhages had no warning. In Walker's group of patients, failing vision and hemiplegia were the next most common symptoms. Diplopia is fairly frequent and is most often due to involvement of the oculomotor nerve but may be due to involvement of the trochlear or abducens nerve. Occasionally, papilledema is present.

Surgical treatment of supraclinoid aneurysms of the carotid artery consists mainly of cervical ligation of the internal carotid artery, which is probably inadequate

alone; or this combined with ligation of the internal carotid artery intracranially; and clipping of the neck of the aneurysm.

Case 4 illustrates a large ruptured aneurysm of the supraclinoid internal carotid artery that was treated by the trapping method. The internal carotid was ligated in the neck, and a clip was applied to the internal carotid intracranially, distal to the aneurysm.

CASE 4.—A 63-year-old white woman had sudden, severe headache, followed in a few minutes by loss of consciousness for several minutes. Upon regaining consciousness, she complained of weakness of the right leg. Examination revealed mental confusion, weakness of the right leg and suppression of the reflexes of the right leg. A lumbar puncture done on admission revealed a pressure of 380 mm. of water, with grossly bloody spinal fluid. Routine roentgenograms of the skull were normal. Bilateral arteriographic study (Fig. 3, A and B) revealed a large aneurysm of the left internal carotid. After the arteriographic procedure this patient had mild expressive aphasia. It was decided that she could not tolerate immediate ligation of the internal carotid artery in the neck, and accordingly, several days later, the left internal carotid artery was exposed and gradually occluded with a clamp designed by Dr. Gayle Crutchfield. After three days the artery was completely occluded, without ill effects. Three days later a left frontal craniotomy was done, and two silver clips were applied intracranially to the left internal carotid, dis-

The charge is often made against radiation treatment that it is so empirical, doubtless in the early years it was so, and doses which could be measured with no certainty were given with more hope than warrant. But it should now be admitted that haphazard methods are giving way to well thought out schemes of treatment, and these have their basis upon a working knowledge of what are the most probable reactions that will, in due course, supervene upon the exposures, more over with a fair guarantee that the prescribed doses will be administered with a considerable degree of accuracy.

The book is among the most important of the works of the French authors who have contributed so much to the advancement of the subject of radiotherapy

S. RUSS

Bones a study of the development and structure of the vertebrate skeleton

By P. D. F. MURRAY, M.A., D.Sc. Cambridge University Press 1936
Pp. x and 203, 45 figs. 8s. 6d.

Under the attractive short title of "Bones," Dr P. D. F. Murray, whose own experimental work on the self-differentiation of skeletal elements is well known, has written a very useful introduction to the perennial and fascinating problems of the development and shaping of bones and the perfecting of their adaptive structure. His chief theme is the relation between "the morphogenic factors intrinsic in the elements" and those, "mainly of a mechanical nature, which act upon them from without."

The primary development and the ossification of the cartilage models of limb bones are considered in the light of new experimental work, much of it—including some unpublished items—from the Strangeways Laboratory at Cambridge. The experimental attack on these problems seems now to have proved that the intrinsic growth pattern of the skeletal elements is the main factor in the morphogenesis of limb bones, i.e. that the gross form of the elements is self-differentiated and does not depend upon functional or other extrinsic stimuli.

The gross form of replacing bones is determined in turn by the form of their cartilaginous scaffolding, but, as the bones grow, functional and other extrinsic factors begin to play their parts. The effect of the mechanical conditions of function, necessary for complete development, is illustrated in particular by Weidenreich's study of the calcaneum.

The author has a good deal to say about joints. He describes Fell and Canti's experiments, which seem to show that in the primary development of a joint there is an intrinsic factor which is localised, though not rigidly, in the limb mosaic, but that it depends for its expression on its spatial relation to the shaft of a bone. Joints are therefore not self-differentiated in the strict sense, neither does their development, nor even the form of articular surfaces, depend upon functional activity.

The formation of pseudarthroses in the fully developed skeleton is, however, another matter. The chapter on functional changes in the forms of bones includes a discussion, specially interesting to the pathologist, of changes in joints and the mechanical determination of the form of pseudarthroses.

In these earlier chapters there are indeed so many interesting points that it is difficult to summarise. But one of the author's own suggestions,

brain substance, producing increased intracranial pressure. Cerebral vasospasm is present from the beginning and usually lasts from two to three weeks. Hamby¹⁴ has also pointed out that the mortality rate is decidedly lowered among patients who are operated upon after at least three weeks have elapsed since the initial hemorrhage.

To add support to the direct attack on aneurysms of the circle of Willis, Norlén and Barnum²¹ reported 15 cases in which the neck of the aneurysm of the anterior communicating artery was clipped or ligated with one operative death. In the 14 survivors, there was no recurrent bleeding.

Although in my own opinion the only cure for aneurysms of the anterior part of the circle of Willis is the direct attack and although I have successfully applied a clip to the neck of an aneurysm in several cases, the following 2 cases illustrate some of the difficulties encountered when the direct approach is used. In the first instance the aneurysm ruptured during the dissection, with profuse bleeding, and in the second it was impossible to apply a clip to the aneurysm and was necessary to reinforce it with hammered muscle.

CASE 5.—A 14-year-old white boy had an onset of sudden severe headache, followed by unconsciousness for one hour. Upon awakening he had severe headache and stiffness of the neck, but no paralysis. Examination on admission to the hospital one day later revealed mental sluggishness, but there were no positive neurologic abnormalities. A lumbar puncture was done, revealing a pressure of 180 mm. of water with grossly bloody spinal fluid. Routine roentgenograms of the skull were normal. Bilateral percutaneous arteriographic study (Fig. 4, *A* and *B*) with 35 per cent diodrast revealed a small aneurysm on the left anterior cerebral artery just proximal to the anterior communicating artery. A left frontal craniotomy was done and the aneurysm exposed. It had an extremely thin wall, and the blood could be seen eddying within it. During the dissection and mobilization of this aneurysm so that a clip could be applied to the neck,



Fig. 6 (*Case 7*).—*A*, aneurysm of peripheral part of left middle cerebral artery. *B*, aneurysm of peripheral part of middle cerebral artery and elevation of sylvian vessels due to clot in temporal lobe.

there was a rupture with profuse bleeding. A clip was finally applied to the neck of the aneurysm and also to the anterior cerebral artery. The patient did not regain consciousness and died the next day.

CASE 6.—A 51-year-old white woman was admitted to the hospital because of a sudden, severe headache without loss of

revolutionised the treatment of the anæmias, and entirely re orientated classification. We note that in the ætiology of pernicious anæmia the authors are unconvinced as to the importance of gastritis, and refuse to blame ago or the germ plasm, and they cite the experimental evidence showing that nutritional defects can reproduce in animals widespread changes in the mouth and throughout the alimentary tract.

This is an admirable book for clinicians who wish to keep abreast of the rapid developments in hæmatology which have been made during the last few years.

The nature and treatment of asthma, hay fever and migraine with other clinical studies

By A. G. AULD. London. H. K. Lewis. 1930. Pp. x and 257. 12s. 6d.

The bulk of this volume of collected papers can hardly be classified as pathological, though the author deals with some subjects such as peptone therapy, pyrogenic treatment with metals, allergy, etc., which are of general pathological interest. The papers vary in quality as original contributions to medicine, but all of them give evidence of a conscientious first hand study of disease. Those on peptone treatment are of special interest as it is a subject which the author may be said to have made his own.

headache and coma recurred. A repeated spinal puncture revealed a pressure of 350 mm. of water, with bloody spinal fluid. Bilateral carotid arteriograms (Fig. 7) were taken, and an aneurysm was observed on the left anterior cerebral artery, which filled from the left injection. There was depression of the left anterior cerebral artery, suggesting a mass lesion. A left frontal craniotomy was done, and a large hematoma was observed in the frontal lobe, extending into the anterior horn of the left ventricle. The hematoma was removed by suction; a clip was applied to the neck of the aneurysm, and the aneurysm was removed. The postoperative course was stormy for several days, and the patient had pronounced weakness of both legs for approximately two weeks. When seen two months after discharge from the hospital, he was normal mentally and had no neurologic deficits.

Aneurysms of the posterior fossa are rare, and I have never encountered one except on postmortem examination. The basilar artery is frequently involved, producing multiple involvement of the cranial nerves. Diagnosis can be established by vertebral arteriographic study. Rizzoli and Hayes²² reported the successful removal of a berry aneurysm of the left posterior inferior cerebral artery in the



Fig. 7 (Case 8).—Aneurysm of peripheral part of left anterior cerebral artery and depression of anterior cerebral artery due to hematoma of frontal lobe.



Fig. 8 (Case 9).—Arteriovenous aneurysm and small berry aneurysm in right frontal region. Note depression of anterior cerebral artery by an intracerebral hematoma.

case of a man who had a subarachnoid hemorrhage. The aneurysm was discovered on operation after a ventriculogram had revealed hydrocephalus with a shift of the fourth ventricle to the right.

Arteriovenous Malformations.—Arteriovenous malformations, although they may occur in other areas, usually occur in the region of supply of the middle cerebral artery, though rarely in the posterior fossa. These lesions are most often on the cortex, with subcortical extension. They usually produce jacksonian or generalized seizures. The aneurysm ruptures and produces a subarachnoid hemorrhage in about 20 per cent of the cases. A patient with previous epilepsy in whom sudden subarachnoid bleeding occurs should be suspected of having an arteriovenous malformation. The bleeding may be entirely subarachnoid, or it may be associated with an intracerebral clot. Treatment consists of symptomatic therapy with anticonvulsive medication or operative intervention. Operative measures vary from cervical ligation to direct attack on the aneurysm. The smaller lesion may be excise · excision of

- T C STAMP and E B HENDRY The immunising activity of certain chemical fractions isolated from haemolytic streptococci
- G W N G BONCHALL, J W McLEOD and BERTHA WHEATLEY Observations on the contrast between pneumococcal and streptococcal hemolysins
- MARGARET LLEWELLYN SMITH The multiplicity of staphylococcus hemolysins
- A W DOWNIE Experiments on immunity to staphylococcus
- H N GREEN Some observations on a bactericidal factor in human serum
- A FLEMING The antibacterial properties of para amino benzene-sulphonamide
- G A H BUTTLE The action of para amino benzene sulphonamide on bacteria
- * T LUISDEN A simple method of demonstrating the effects of cytotoxins
- LUCY WILLS, P W CLUTTERBUCK and BARBARA D F EVANS A new factor in the production and cure of certain macrocytic anemias
- GRIZEL R BORTHWICK and J D A GRAY The type of *Cl welchii* in human faeces with special reference to pernicious anemia
- R A Q O'MEARA Influence of copper and iron on the growth of *Cl tetani*
- DORIS A BARDSLEY The numerical estimation of coliform bacilli in water
- I H MACLEAN and E W FISH Cultures from the apices and pulps of living and dead teeth
- J C DICK (1) A case of endothelioma of the pericardium (2) A case of erysipelas
- C G PAINT A method of examination of the motility of human polymorphonuclear leucocytes
- J W ORR (1) A malignant tumour of the thymus in a rabbit (carcinoma of the reticulum cells) (2) Generalised enlargement of the bones of a rabbit, with changes resembling those of Paget's disease
- D M PRYCE and C W MORLEY Carcinoma of the small gut in a guinea pig
- D M PRYCE A simple method of staining reticulocytes in blood films
- C E VAN ROOYEN Elementary bodies in infectious myxomatosis of the rabbit (virus myxomatosum of Sanarelli)
- C E VAN ROOYEN and A J RHODES Inclusion bodies in fibroblasts in vaccinal keratitis of the rabbit
- A B ROSHER and W T S COLF (1) Two organisms morphologically resembling *C diphtheriae* (2) A peculiar gram negative organism
- DOROTHY M VAUX Malignant disease of the thyroid gland
- W G BARNARD Microphotographic transparencies in colour
- A H T ROBB SMITH Graff's technique for removing the upper air passages and pharynx
- JOAN B HARAM and ELIZABETH H LEPPER A case of lymphatic leukaemia with changes in both breasts
- BEATRICE D PULLINGER and H W FLOREY Proliferation of lymphatics in inflammation
- C R AMES A rapid method of preparing tissue desiccates

tients die with the second attack. The mortality rate from surgical intervention, by direct attack on the aneurysm, is no more than 20 per cent, which is definitely lower than the mortality rate among patients who are left untreated.

Aneurysms of the peripheral portions of the major cerebral vessels are usually not *diagnosed* before rupture, at which time they produce a subarachnoid hemorrhage and frequently an intracerebral clot. The treatment of choice is the direct attack on the aneurysm, evacuation of the clot, and clipping of the neck of the aneurysm. Cervical ligation is probably of no significant benefit in the treatment of peripheral aneurysms.

Arteriovenous malformations are in many cases handled conservatively, particularly when the only symptoms are convulsive seizures. Smaller lesions can be satisfactorily removed by surgical means, but in many instances the larger lesions are impossible to remove without causing significant increases in mortality and morbidity.

ZUSAMMENFASSUNG

Sowohl geplatzte wie nicht geplatzte Aneurysmen der A. carotis int. unterhalb des Proc. clinoideus können erfolgreich durch blosse Ligatur am Halse oder in Verbindung mit Abklemmung innerhalb des Schädels, wodurch das Aneurysma verödet wird, behandelt werden. Oberhalb des Proc. clinoideus liegende Aneurysmen werden in den meisten Fällen am besten mit der Verödungsmethode behandelt.

Die Aneurysmen des Willissen'schen Zirkels haben, wenn sie einen Riss aufweisen, eine Sterblichkeit von 50 Prozent und mehr. Das Auftreten von Rückfällen kann eine Höhe von 50 Prozent erreichen, und ungefähr 70 bis 80 Prozent der Patienten sterben am zweiten Anfall. Die Sterblichkeits-

quote als Folge eines direkten chirurgischen Angriffs auf das Aneurysma ist nicht höher als 20 Prozent und bestimmt niedriger als bei Kranken, die unbehandelt geblieben sind.

Aneurysmen der peripheren Abschnitte der grösseren Hirngefässe werden im allgemeinen nicht vor dem Platzen entdeckt; dann verursachen sie eine subarachnoidale Blutung und häufig ein Blutgerinnsel innerhalb des Gehirns. Die Behandlung der Wahl besteht in direktem Angriff auf das Aneurysma, Ausräumung des Gerinnsels und Abklemmung des Halses des Aneurysmas. Die Halsligatur bietet offenbar keine bedeutenden Vorteile.

Arteriovenöse Missbildungen werden in vielen Fällen, besonders wenn die einzigen Symptome in Krampfanfällen bestehen, konservativ behandelt.

Kleinere Veränderungen können auf chirurgischem Wege erfolgreich beseitigt werden, während die grösseren sich nicht ohne wesentliche Erhöhung der Sterblichkeit und der Morbidität resektieren lassen.

RIASSUNTO

L'aneurisma della carotide interna, sottoclinicoide rotto o non rotto, può essere trattato efficacemente con la legatura dell'arteria cervicale. Gli aneurismi sopraclinoidei, invece, sono da trattare preferibilmente con il metodo classico.

Gli aneurismi del poligono di Willis quando si rompono danno il 50% di mortalità. La frequenza delle recidive va fino al 50% e il 70-80% dei malati muoiono dopo il secondo attacco. La mortalità operatoria, nei casi di aggressione diretta dell'aneurisma, non è maggiore del 20%, il che è di gran lunga meglio di quanto avviene nei pazienti non operati.

L'aneurisma dei tratti più periferici delle arterie cerebrali più importanti di solito non viene diagnosticato prima della rottura, in coincidenza della quale deter-

- T C STAMP and E B HENDRY The immunising activity of certain chemical fractions isolated from hemolytic streptococci
- G W N G BOXHALL, J W McLEOD and BERTHA WHEATLEY Observations on the contrast between pneumococcal and streptococcal haemolysins
- MARGARET LLEWELLYN SMITH The multiplicity of staphylococcus hemolysins
- A W DOWNIE Experiments on immunity to staphylococcus
- H N GREEN Some observations on a bactericidal factor in human serum
- A FLEMING The antibacterial properties of para amino benzene sulphonamide
- G A H BUTTLE The action of para amino benzene sulphonamide on bacteria
- * T LUMSDEN A simple method of demonstrating the effects of cytotoxins
- LUCY WILLS, P W CLUTTERBUCK and BARBARA D F EVANS A new factor in the production and cure of certain macrocytic anemias
- GRIZEL R BORTHWICK and J D A GRAY The type of *Cl welchii* in human faeces with special reference to pernicious anemia
- R A Q O'MEARA Influence of copper and iron on the growth of *Cl tetani*
- DORIS A BARDSLEY The numerical estimation of coliform bacilli in water
- I H MACLEAN and E W LISH Cultures from the apices and pulps of living and dead teeth
- J C DICK (1) A case of endothelioma of the pericardium (2) A case of erysipelas
- C G PAINE A method of examination of the motility of human polymorphonuclear leucocytes
- J W ORR (1) A malignant tumour of the thymus in a rabbit (carcinoma of the reticulum cells) (2) Generalised enlargement of the bones of a rabbit, with changes resembling those of Paget's disease
- D M PRYCE and C W MORLEY Carcinoma of the small gut in a guinea pig
- D M PRYCE A simple method of staining reticulocytes in blood films
- C E VAN ROOYEN Elementary bodies in infectious myxomatosis of the rabbit (virus myxomatosum of Suardelli)
- C E VAN ROOYEN and A J RHODES Inclusion bodies in fibroblasts in vaccinia keratitis of the rabbit
- A B ROSHER and W T S COLE (1) Two organisms morphologically resembling *C diphtheriae* (2) A peculiar gram negative organism
- DOROTHY M VAUX Malignant disease of the thyroid gland
- W G BARNARD Microphotographic transparencies in colour
- A H T ROBB SMITH Graff's technique for removing the upper air passages and pharynx
- JOAN B HARAM and ELIZABETH H LEPPER A case of lymphatic leukaemia with changes in both breasts
- BEATRICE D PULLINGER and H W FLOREY Proliferation of lymphatics in inflammation
- C R AMES A rapid method of preparing tissue desiccates

casos las lesiones mayores son imposibles de extirpar sin causar una alza en las mortalidad y morbilidad.

SUMARIO

Os aneurismas da carótida interna, abaixo da apófise clinóide, rotos ou não, podem ser tratados corretamente pela ligadura cervical isolada ou em combinação com a hemostasia intra-craniana. Os aneurismas supra-clinoidianos são melhor tratados pelo grampeamento.

Os aneurismas do triângulo de Willis, quando há rutura, elevam a mortalidade a 50% ou mais. A incidência de recidiva pode atingir 50% e em, aproximadamente, 70-80% os doentes morrem no segundo ataque. A taxa de mortalidade por intervenção cirúrgica sobre os aneurismas não é maior que 20%, cifra que é indiscutivelmente mais baixa que a da mortalidade entre os pacientes não tratados.

Os aneurismas das porções periféricas dos grandes vasos cerebrais não são habitualmente diagnosticados antes da rutura, período em que provocam hemorragia sub-aracnóide e frequentes coágulos intracerebrais. O melhor tratamento é acesso cirúrgico direto ao aneurisma, com evacuação do coágulo e e grampeamento no colo do aneurisma. A ligadura cervical parece não exercer benefício significativo.

As malformações arterio-venosas são, em muitos casos, tratadas conservadoramente, sobretudo quando os sintomas são apenas crises convulsivas.

As lesões menores podem ser ressecadas com êxito cirúrgicamente, mas, em muitos casos as lesões maiores são impossíveis de remover sem causar maiores mortalidade e morbilidade.

REFERENCES

1. Moniz, E.: L'encephalographie arterielle, son importance dans la localisation des tumeurs cere-

brales, *Rev. Neurol.* 2:72-90, 1927.

2. Jefferson, G.: (a) Compression of the Chiasm, Optic Nerves and Optic Tracts by Intracranial Aneurysms, *Brain* 60:444-497, 1937. (b) On the Saccular Aneurysms of the Internal Carotid Artery in the Cavernous Sinus, *Brit. J. Surg.* 26: 267-302, 1938.

3. Dandy, W. E.: Intracranial Arterial Aneurysms. Ithaca, N. Y.: Comstock, 1944.

4. Dunn, J. Jr.; Uihlein, A., and Holman, C. B.: The Use of Sodium Diacetozate in Cerebral Angiography, *J. Neurosurg.* 13:627-633, 1956.

5. Abbott, K. H.; Gay, J. R., and Goodall, R. J.: Clinical Complications of Cerebral Angiography, *J. Neurosurg.* 9:258-274, 1952.

6. Sugar, O.: Pathologic Anatomy and Angiography of Intracranial Vascular Anomalies, *J. Neurosurg.* 8:3-22, 1951.

7. Padgett, D. H.: The Development of the Cranial Arteries in the Human Embryo, *Contr. Embryol. Carnegie Inst.* 212:32:205-261, 1958.

8. Dandy, W. E.: Results Following Ligation of Internal Carotid Artery, *Arch. Surg.* 45:521-533, 1942.

9. Voris, H. C.: Complications of Ligation of the Internal Carotid Artery, *J. Neurosurg.* 8:119-131, 1951.

10. Poppen, J. L.: Specific Treatment of Intracranial Aneurysms, *J. Neurosurg.* 8:75-102, 1951.

11. Steelman, H. F.; Hayes, G. J., and Rizzoli, H. V.: Surgical Treatment of Saccular Intracranial Aneurysms, *J. Neurosurg.* 10:564-576, 1953.

12. Bassett, R. C.; List, C. F., and Lemmen, L. J.: Surgical Treatment of Intracranial Aneurysms, *Surg., Gynec. & Obst.* 95:701-708, 1952.

13. Black, S. P. W., and German, W. J.: The Treatment of Internal Carotid Artery Aneurysms by Proximal Arterial Ligation: A Follow-Up Study, *J. Neurosurg.* 10:590-601, 1953.

14. Hamby, W. E.: The Surgical Treatment of Intracranial Aneurysms, *Arch. Neurol. & Psychiat.* 75:345-349, 1956.

15. Walker, A. E.: Clinical Localization of Intracranial Aneurysms and Vascular Anomalies, *Neurology* 6:79-90, 1956.

16. McDonald, C. A., and Korb, M.: Intracranial Aneurysms, *Arch. Neurol. & Psychiat.* 42:298, 1939.

17. Hyland, H. N.: Prognosis in Spontaneous Subarachnoid Hemorrhage, *Arch. Neurol. & Psychiat.* 63:61-75, 1950.

18. Hamby, W. B.: Intracranial Aneurysms. Springfield, Ill.: Chas. C Thomas, Publisher, 1952, chap. 21, p. 564.

19. Norlén, G., and Olivecrona, H.: The Treatment of Aneurysms of the Circle of Willis, *J. Neurosurg.* 10:404-415, 1953.

20. Norlén, G.: The Pathology, Diagnosis and Treatment of Intracranial Saccular Aneurysms, *Proc. Roy. Soc. Med.* 45:291-298, 1952.

21. Norlén, G., and Barnum, A. S.: Surgical Treatment of Aneurysms of the Anterior Communicating Artery, *J. Neurosurg.* 10:634-650, 1953.

22. Rizzoli, H. V., and Hayes, G. J.: Congenital Berry Aneurysm of the Posterior Fossa, *J. Neurosurg.* 10:550, 1953.

specimen is sealed with paraffin. The formol fixes the two cultures and preserves them indefinitely. Few if any of the cells float off during the process and of course phagocytosis is prevented.

This method of demonstration makes it easy to count at leisure the percentage of dead cells even when it is small.

The nuclear changes are perfectly seen in these specimens. In JRS cells which were alive when the formol saline was applied the nuclei are usually invisible, only in very flatly spread out cells are they occasionally perceptible and even then they are indistinct. In cells killed by antisera the shrunken, sharply defined nuclei are very striking objects, visible even with a $\frac{2}{3}$ inch objective. The only disadvantage of the method is that the distended membranes not infrequently shrink and become imperceptible as the result of fixation, but the pyknosis and other evidences of death are sufficiently convincing.

REFERENCE

LUMSDEN, T, MACRAE, T F, AND 1934 *this Journal*, XXXIX 595
SKIPPER, E

casos las lesiones mayores son imposibles de extirpar sin causar una alza en las mortalidad y morbilidad.

SUMARIO

Os aneurismas da carótida interna, abaixo da apófise clinoide, rotos ou não, podem ser tratados corretamente pela ligadura cervical isolada ou em combinação com a hemostasia intra-craniana. Os aneurismas supra-clinoidianos são melhor tratados pelo grampeamento.

Os aneurismas do triângulo de Willis, quando há ruptura, elevam a mortalidade a 50% ou mais. A incidência de recidiva pode atingir 50% e em, aproximadamente, 70-80% os doentes morrem no segundo ataque. A taxa de mortalidade por intervenção cirúrgica sobre os aneurismas não é maior que 20%, cifra que é indiscutivelmente mais baixa que a da mortalidade entre os pacientes não tratados.

Os aneurismas das porções periféricas dos grandes vasos cerebrais não são habitualmente diagnosticados antes da ruptura, período em que provocam hemorragia subaracnóide e frequentes coágulos intracerebrais. O melhor tratamento é acesso cirúrgico direto ao aneurisma, com evacuação do coágulo e grampeamento no colo do aneurisma. A ligadura cervical parece não exercer benefício significativo.

As malformações arterio-venosas são, em muitos casos, tratadas conservadoramente, sobretudo quando os sintomas são apenas crises convulsivas.

As lesões menores podem ser ressecadas com êxito cirúrgicamente, mas, em muitos casos as lesões maiores são impossíveis de remover sem causar maiores mortalidade e morbilidade.

REFERENCES

1. Moniz, E.: L'encephalographie arterielle, son importance dans la localisation des tumeurs cerebrales, *Rev. Neurol.* 2:72-90, 1927.
2. Jefferson, G.: (a) Compression of the Chiasm, Optic Nerves and Optic Tracts by Intracranial Aneurysms, *Brain* 60:444-497, 1937. (b) On the Saccular Aneurysms of the Internal Carotid Artery in the Cavernous Sinus, *Brit. J. Surg.* 26: 267-302, 1938.
3. Dandy, W. E.: Intracranial Arterial Aneurysms. Ithaca, N. Y.: Comstock, 1944.
4. Dunn, J. Jr.; Uihlein, A., and Holman, C. B.: The Use of Sodium Diacetozate in Cerebral Angiography, *J. Neurosurg.* 13:627-633, 1956.
5. Abbott, K. H.; Gay, J. R., and Goodall, R. J.: Clinical Complications of Cerebral Angiography, *J. Neurosurg.* 9:258-274, 1952.
6. Sugar, O.: Pathologic Anatomy and Angiography of Intracranial Vascular Anomalies, *J. Neurosurg.* 8:3-22, 1951.
7. Padgett, D. H.: The Development of the Cranial Arteries in the Human Embryo, *Contr. Embryol. Carnegie Inst.* 212:32:205-261, 1958.
8. Dandy, W. E.: Results Following Ligation of Internal Carotid Artery, *Arch. Surg.* 45:521-533, 1942.
9. Voris, H. C.: Complications of Ligation of the Internal Carotid Artery, *J. Neurosurg.* 8:119-131, 1951.
10. Poppen, J. L.: Specific Treatment of Intracranial Aneurysms, *J. Neurosurg.* 8:75-102, 1951.
11. Steelman, H. F.; Hayes, G. J., and Rizzoli, H. V.: Surgical Treatment of Saccular Intracranial Aneurysms, *J. Neurosurg.* 10:564-576, 1953.
12. Bassett, R. C.; List, C. F., and Lemmen, L. J.: Surgical Treatment of Intracranial Aneurysms, *Surg., Gynec. & Obst.* 95:701-708, 1952.
13. Black, S. P. W., and German, W. J.: The Treatment of Internal Carotid Artery Aneurysms by Proximal Arterial Ligation: A Follow-Up Study, *J. Neurosurg.* 10:590-601, 1953.
14. Hamby, W. E.: The Surgical Treatment of Intracranial Aneurysms, *Arch. Neurol. & Psychiat.* 75:345-349, 1956.
15. Walker, A. E.: Clinical Localization of Intracranial Aneurysms and Vascular Anomalies, *Neurology* 6:79-90, 1956.
16. McDonald, C. A., and Korb, M.: Intracranial Aneurysms, *Arch. Neurol. & Psychiat.* 42:298, 1939.
17. Hyland, H. N.: Prognosis in Spontaneous Subarachnoid Hemorrhage, *Arch. Neurol. & Psychiat.* 63:61-75, 1950.
18. Hamby, W. B.: Intracranial Aneurysms. Springfield, Ill.: Chas. C Thomas, Publisher, 1952, chap. 21, p. 564.
19. Norlén, G., and Olivecrona, H.: The Treatment of Aneurysms of the Circle of Willis, *J. Neurosurg.* 10:404-415, 1953.
20. Norlén, G.: The Pathology, Diagnosis and Treatment of Intracranial Saccular Aneurysms, *Proc. Roy. Soc. Med.* 45:291-298, 1952.
21. Norlén, G., and Barnum, A. S.: Surgical Treatment of Aneurysms of the Anterior Communicating Artery, *J. Neurosurg.* 10:634-650, 1953.
22. Rizzoli, H. V., and Hayes, G. J.: Congenital Berry Aneurysm of the Posterior Fossa, *J. Neurosurg.* 10:550, 1953.

specimen is sealed with paraffin. The formol fixes the two cultures and preserves them indefinitely. Few if any of the cells float off during the process and of course phagocytosis is prevented.

This method of demonstration makes it easy to count at leisure the percentage of dead cells even when it is small.

The nuclear changes are perfectly seen in these specimens. In J R S cells which were alive when the formol saline was applied the nuclei are usually invisible; only in very flatly spread out cells are they occasionally perceptible and even then they are indistinct. In cells killed by antisera the shrunken, sharply defined nuclei are very striking objects, visible even with a $\frac{2}{3}$ inch objective. The only disadvantage of the method is that the distended membranes not infrequently shrink and become imperceptible as the result of fixation, but the pyknosis and other evidences of death are sufficiently convincing.

REFERENCE

LUMSDEN, T, MACRAE, T F, AND 1934 *this Journal*, **LXXIX** 595
SKIPPER, E

casos las lesiones mayores son imposibles de extirpar sin causar una alza en las mortalidad y morbilidad.

SUMARIO

Os aneurismas da carótida interna, abaixo da apófise clinóide, rotos ou não, podem ser tratados corretamente pela ligadura cervical isolada ou em combinação com a hemostasia intra-craniana. Os aneurismas supra-clinoidianos são melhor tratados pelo grampeamento.

Os aneurismas do triangulo de Willis, quando há rutura, elevam a mortalidade a 50% ou mais. A incidência de recidiva pode atingir 50% e em, aproximadamente, 70-80% os doentes morrem no segundo ataque. A taxa de mortalidade por intervenção cirúrgica sobre os aneurismas não é maior que 20%, cifra que é indiscutivelmente mais baixa que a da mortalidade entre os pacientes não tratados.

Os aneurismas das porções periféricas dos grandes vasos cerebrais não são habitualmente diagnósticados antes da rutura, período em que provocam hemorragia sub-aracnóide e frequentes coágulos intracerebrais. O melhor tratamento é acesso cirúrgico direto ao aneurisma, com evacuação do coágulo e e grampeamento no colo do aneurisma. A ligadura cervical parece não exercer benefício significativo.

As malformações arterio-venosas são, em muitos casos, tratadas conservadoramente, sobretudo quando os sintomas são apenas crises convulsivas.

As lesões menores podem ser ressecadas com êxito cirúrgicamente, mas, em muitos casos as lesões maiores são impossíveis de remover sem causar maiores mortalidade e morbilidade.

REFERENCES

1. Moniz, E.: L'encephalographie arterielle, son importance dans la localisation des tumeurs cere-

brales, Rev. Neurol. 2:72-90, 1927.
2. Jefferson, G.: (a) Compression of the Chiasm, Optic Nerves and Optic Tracts by Intracranial Aneurysms, Brain 60:444-497, 1937. (b) On the Saccular Aneurysms of the Internal Carotid Artery in the Cavernous Sinus, Brit. J. Surg. 26: 267-302, 1938.
3. Dandy, W. E.: Intracranial Arterial Aneurysms. Ithaca, N. Y.: Comstock, 1944.
4. Dunn, J. Jr.; Uihlein, A., and Holman, C. B.: The Use of Sodium Diacetozate in Cerebral Angiography, J. Neurosurg. 13:627-633, 1956.
5. Abbott, K. H.; Gay, J. R., and Goodall, R. J.: Clinical Complications of Cerebral Angiography, J. Neurosurg. 9:258-274, 1952.
6. Sugar, O.: Pathologic Anatomy and Angiography of Intracranial Vascular Anomalies, J. Neurosurg. 8:3-22, 1951.
7. Padgett, D. H.: The Development of the Cranial Arteries in the Human Embryo, Contr. Embryol. Carnegie Inst. 212:32:205-261, 1958.
8. Dandy, W. E.: Results Following Ligation of Internal Carotid Artery, Arch. Surg. 45:521-533, 1942.
9. Voris, H. C.: Complications of Ligation of the Internal Carotid Artery, J. Neurosurg. 8:119-131, 1951.
10. Poppen, J. L.: Specific Treatment of Intracranial Aneurysms, J. Neurosurg. 8:75-102, 1951.
11. Steelman, H. F.; Hayes, G. J., and Rizzoli, H. V.: Surgical Treatment of Saccular Intracranial Aneurysms, J. Neurosurg. 10:564-576, 1953.
12. Bassett, R. C.; List, C. F., and Lemmen, L. J.: Surgical Treatment of Intracranial Aneurysms, Surg., Gynec. & Obst. 95:701-708, 1952.
13. Black, S. P. W., and German, W. J.: The Treatment of Internal Carotid Artery Aneurysms by Proximal Arterial Ligation: A Follow-Up Study, J. Neurosurg. 10:590-601, 1953.
14. Hamby, W. E.: The Surgical Treatment of Intracranial Aneurysms, Arch. Neurol. & Psychiat. 75:345-349, 1956.
15. Walker, A. E.: Clinical Localization of Intracranial Aneurysms and Vascular Anomalies, Neurology 6:79-90, 1956.
16. McDonald, C. A., and Korb, M.: Intracranial Aneurysms, Arch. Neurol. & Psychiat. 42:298, 1939.
17. Hyland, H. N.: Prognosis in Spontaneous Subarachnoid Hemorrhage, Arch. Neurol. & Psychiat. 63:61-75, 1950.
18. Hamby, W. E.: Intracranial Aneurysms. Springfield, Ill.: Chas. C Thomas, Publisher, 1952, chap. 21, p. 564.
19. Norlén, G., and Olivecrona, H.: The Treatment of Aneurysms of the Circle of Willis, J. Neurosurg. 10:404-415, 1953.
20. Norlén, G.: The Pathology, Diagnosis and Treatment of Intracranial Saccular Aneurysms, Proc. Roy. Soc. Med. 45:291-298, 1952.
21. Norlén, G., and Barnum, A. S.: Surgical Treatment of Aneurysms of the Anterior Communicating Artery, J. Neurosurg. 10:634-650, 1953.
22. Rizzoli, H. V., and Hayes, G. J.: Congenital Berry Aneurysm of the Posterior Fossa, J. Neurosurg. 10:550, 1953.

specimen is sealed with paraffin. The formol fixes the two cultures and preserves them indefinitely. Few if any of the cells float off during the process and of course phagocytosis is prevented.

This method of demonstration makes it easy to count at leisure the percentage of dead cells even when it is small.

The nuclear changes are perfectly seen in these specimens. In JRS cells which were alive when the formol saline was applied the nuclei are usually invisible, only in very flatly spread out cells are they occasionally perceptible and even then they are indistinct. In cells killed by antisera the shrunken, sharply defined nuclei are very striking objects, visible even with a $\frac{2}{3}$ inch objective. The only disadvantage of the method is that the distended membranes not infrequently shrink and become imperceptible as the result of fixation, but the pyknosis and other evidences of death are sufficiently convincing.

REFERENCE

LUMSDEN, T., MACRAE, T. F., AND 1934 *this Journal*, **xxix** 595
SKIPPER, E.

casos las lesiones mayores son imposibles de extirpar sin causar una alza en las mortalidad y morbilidad.

SUMARIO

Os aneurismas da carótida interna, abaixo da apófise clinóide, rotos ou não, podem ser tratados corretamente pela ligadura cervical isolada ou em combinação com a hemostasia intra-craniana. Os aneurismas supra-clinoidianos são melhor tratados pelo grampeamento.

Os aneurismas do triângulo de Willis, quando há rutura, elevam a mortalidade a 50% ou mais. A incidência de recidiva pode atingir 50% e em, aproximadamente, 70-80% os doentes morrem no segundo ataque. A taxa de mortalidade por intervenção cirúrgica sobre os aneurismas não é maior que 20%, cifra que é indiscutivelmente mais baixa que a da mortalidade entre os pacientes não tratados.

Os aneurismas das porções periféricas dos grandes vasos cerebrais não são habitualmente diagnosticados antes da rutura, período em que provocam hemorragia sub-aracnóide e frequentes coágulos intracerebrais. O melhor tratamento é acesso cirúrgico direto ao aneurisma, com evacuação do coágulo e e grampeamento no colo do aneurisma. A ligadura cervical parece não exercer benefício significativo.

As malformações arterio-venosas são, em muitos casos, tratadas conservadoramente, sobretudo quando os sintomas são apenas crises convulsivas.

As lesões menores podem ser ressecadas com êxito cirúrgicamente, mas, em muitos casos as lesões maiores são impossíveis de remover sem causar maiores mortalidade e morbilidade.

REFERENCES

1. Moniz, E.: L'encephalographie arterielle, son importance dans la localisation des tumeurs cere-

brales, *Rev. Neurol.* 2:72-90, 1927.

2. Jefferson, G.: (a) Compression of the Chiasm, Optic Nerves and Optic Tracts by Intracranial Aneurysms, *Brain* 60:444-497, 1937. (b) On the Saccular Aneurysms of the Internal Carotid Artery in the Cavernous Sinus, *Brit. J. Surg.* 26: 267-302, 1938.

3. Dandy, W. E.: Intracranial Arterial Aneurysms. Ithaca, N. Y.: Comstock, 1944.

4. Dunn, J. Jr.; Uihlein, A., and Holman, C. B.: The Use of Sodium Diacetozate in Cerebral Angiography, *J. Neurosurg.* 13:627-633, 1956.

5. Abbott, K. H.; Gay, J. R., and Goodall, R. J.: Clinical Complications of Cerebral Angiography, *J. Neurosurg.* 9:258-274, 1952.

6. Sugar, O.: Pathologic Anatomy and Angiography of Intracranial Vascular Anomalies, *J. Neurosurg.* 8:3-22, 1951.

7. Padgett, D. H.: The Development of the Cranial Arteries in the Human Embryo, *Contr. Embryol. Carnegie Inst.* 212:32:205-261, 1958.

8. Dandy, W. E.: Results Following Ligation of Internal Carotid Artery, *Arch. Surg.* 45:521-533, 1942.

9. Voris, H. C.: Complications of Ligation of the Internal Carotid Artery, *J. Neurosurg.* 8:119-131, 1951.

10. Poppen, J. L.: Specific Treatment of Intracranial Aneurysms, *J. Neurosurg.* 8:75-102, 1951.

11. Steelman, H. F.; Hayes, G. J., and Rizzoli, H. V.: Surgical Treatment of Saccular Intracranial Aneurysms, *J. Neurosurg.* 10:564-576, 1953.

12. Bassett, R. C.; List, C. F., and Lemmen, L. J.: Surgical Treatment of Intracranial Aneurysms, *Surg., Gynec. & Obst.* 95:701-708, 1952.

13. Black, S. P. W., and German, W. J.: The Treatment of Internal Carotid Artery Aneurysms by Proximal Arterial Ligation: A Follow-Up Study, *J. Neurosurg.* 10:590-601, 1953.

14. Hamby, W. E.: The Surgical Treatment of Intracranial Aneurysms, *Arch. Neurol. & Psychiat.* 75:345-349, 1956.

15. Walker, A. E.: Clinical Localization of Intracranial Aneurysms and Vascular Anomalies, *Neurology* 6:79-90, 1956.

16. McDonald, C. A., and Korb, M.: Intracranial Aneurysms, *Arch. Neurol. & Psychiat.* 42:298, 1939.

17. Hyland, H. N.: Prognosis in Spontaneous Subarachnoid Hemorrhage, *Arch. Neurol. & Psychiat.* 63:61-75, 1950.

18. Hamby, W. R.: Intracranial Aneurysms. Springfield, Ill.: Chas. C Thomas, Publisher, 1952, chap. 21, p. 564.

19. Norlén, G., and Olivecrona, H.: The Treatment of Aneurysms of the Circle of Willis, *J. Neurosurg.* 10:404-415, 1953.

20. Norlén, G.: The Pathology, Diagnosis and Treatment of Intracranial Saccular Aneurysms, *Proc. Roy. Soc. Med.* 45:291-298, 1952.

21. Norlén, G., and Barnum, A. S.: Surgical Treatment of Aneurysms of the Anterior Communicating Artery, *J. Neurosurg.* 10:634-650, 1953.

22. Rizzoli, H. V., and Hayes, G. J.: Congenital Berry Aneurysm of the Posterior Fossa, *J. Neurosurg.* 10:550, 1953.

specimen is sealed with paraffin. The formal fixes the two cultures and preserves them indefinitely. Few if any of the cells float off during the process and of course phagocytosis is prevented.

This method of demonstration makes it easy to count at leisure the percentage of dead cells even when it is small.

The nuclear changes are perfectly seen in these specimens. In JRS cells which were alive when the formal saline was applied the nuclei are usually invisible, only in very flatly spread out cells are they occasionally perceptible and even then they are indistinct. In cells killed by antiserum the shrunken, sharply defined nuclei are very striking objects, visible even with a $\frac{2}{3}$ inch objective. The only disadvantage of the method is that the distended membranes not infrequently shrink and become imperceptible as the result of fixation, but the pyknosis and other evidences of death are sufficiently convincing.

REFERENCE

LUMSDEN, T, MACRAE, T F, AND 1934 *this Journal*, **XXX** 595
SKIPPER, E

dural membrane is permitted to remain and does not stretch or yield with growth, the brain of the infant is maintained in a confined space by this envelope, and the blood supply and fluid dynamics are further embarrassed. This may eventuate in mental retardation and epilepsy.³ From the reports of others⁴ and our own observations, several generalizations can be made: 1. Subdural effusions occur in a high percentage of cases of so-called "cured" meningitis. 2. The diplococcus, the meningococcus and *Haemophilus influenzae* are the organisms most likely to cause subdural effusions, but other forms of meningitis may be responsible, e.g., those due to *E. Typhi* and *M. Tuberculosis*. 3. The effusion is frequently bilateral, though it may begin as a unilateral collection. 4. Finally, drainage of the subdural space is necessary and desirable and usually effects dramatic if only temporary improvement. We have observed subdural effusions in association with conditions other than the postmeningitic state: diseases of the respiratory tract and diarrhea, as well as malnutrition — a phenomenon that deserves wider recognition. As has been stated, this "new" syndrome is probably appearing more frequently nowadays since children treated with antibiotics survive and these complications have an opportunity to develop.

The cause of subdural effusions in meningitis and in nonmeningitic states still is not known. It is suspected, however, that any condition that causes a separation of the dura from the arachnoid may cause tearing of the bridging veins in the subdural space, resulting in a small subdural hematoma. The subsequent liquefaction of this blood, highly charged with protein, may exert osmotic tension upon the circulating spinal fluid beneath the arachnoid, drawing it into the subdural space and further increasing the volume. This chain



Portion of subdural neomembrane surgically removed, showing fibrocytes, new blood vessels and lamination (hematoxylin and eosin). (Reproduced by courtesy of the Armed Forces Institute of Pathology.)

of events may occur after spinal air injection in the infant under 2 years of age, as was pointed out by Smith and Carothers.⁵ It may also occur after an operation for hydrocephalus, as reported by Anderson.⁶

On the basis of the foregoing theory we speculated that excessive withdrawal of spinal fluid for diagnostic purposes in the case of an infant with suspected meningitis might create a similar sagging of the brain and tearing of the bridging veins that could initiate this sequential reaction.

We noted that, in many instances, unnecessarily elaborate laboratory tests required a volume of 10 to 15 cc. of spinal fluid, and that this amount was being regularly withdrawn from infants for diagnostic studies. Dr. Hattie Alexander, an authority on the treatment of bacterial meningitis in children, has stated that in her clinic it is customary to withdraw 10 to 15 cc.⁷ She too reports an incidence of

specimen is sealed with paraffin. The formal fixes the two cultures and preserves them indefinitely. Few if any of the cells float off during the process and of course phagocytosis is prevented.

This method of demonstration makes it easy to count at leisure the percentage of dead cells even when it is small.

The nuclear changes are perfectly seen in these specimens. In JRS cells which were alive when the formal saline was applied the nuclei are usually invisible, only in very flatly spread out cells are they occasionally perceptible and even then they are indistinct. In cells killed by antisera the shrunken, sharply defined nuclei are very striking objects, visible even with a $\frac{2}{3}$ inch objective. The only disadvantage of the method is that the distended membranes not infrequently shrink and become imperceptible as the result of fixation, but the pyknosis and other evidences of death are sufficiently convincing.

REFERENCE

- LUMSDEN, T., MACRAE, T. F., AND 1934 *this Journal*, **XXXV** 595
SKIPPER, E

A Study of a Series of Myelograms

J. RICHARD NOLAN, M.D., F.I.C.S., D.A.B.

ASHTABULA, OHIO

MYELOGRAPHY is a roentgen diagnostic procedure using contrast roentgenography to outline the subarachnoid space of the spinal cord.

With ordinary roentgen technics the bony vertebral bodies, arches, processes and facets are visible. Invisible are the spinal cord and its three meninges, the nerve roots, the intervertebral disc and other soft tissues. If the physician can not visualize a soft part, he attempts to fill or outline that part with some substance he can see. For example, he cannot see a stomach; therefore he fills it with barium. With the fluoroscope and roentgen plates he sees the barium and interprets the shadows and densities. A crater or ulcer appears in profile as a projecting finger of barium. In a similar way, with the myelogram one floats a radiopaque oil in the watery subarachnoid spinal fluid. The globule of oil floats like the bubble in a spirit level (reversed—the oil is actually heavier than water). Then with the fluoroscope, the physician can see the oil. He can elevate the patient's head and watch the oil globule float caudad. He can take roentgen plates of any area that seems interesting, for detailed study at his leisure. The oil, appearing like mercury or molten lead, outlines the subarachnoid space. If there is a space-occupying lesion in the cord, the cauda equina or the spinal canal, it may be demonstrated as a transparent area where no oil can flow. The mass may cause a filling defect in the regular shape of the oil globule. The

shape of the myelographic shadows must be interpreted and correlated with the clinical data, so that the taking of myelograms becomes one more laboratory test that may (or may not) aid the physician in understanding his case. Like other laboratory procedures, myelographic study is not perfect. It has a percentage of error. It is the purpose of this study to identify the errors and measure their frequency.

Indications.—The indications for myelograms are few and simple:

1. To demonstrate the presence of a mass in the spinal canal. Example: Tumor, herniated nucleus pulposus.

2. To rule out the presence of such masses before any other operation is performed. Example: Before spinal fusion for spondylolisthesis, if the patient has had obvious nerve root pressure.

3. To outline the subarachnoid space in the presence of congenital anomalies. Example: Before operation in cases of spina bifida.

The contraindications are probably harder to specify, but the following conditions may be considered.

1. The presence of infection in the cord or its meninges.

2. Emotional instability in the patient. No specific example need be listed, since all surgeons have encountered patients who attribute their headaches, ulcers and pes planus to a diagnostic lumbar puncture.

3. Any degenerative disease of the brain or cord, such as multiple sclerosis.

4. General systemic debility, or serious illness.

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.
Submitted for publication Sept. 21, 1956.

peripheral zone of cytoplasm, but is absent from many, (4) the atypical myoblast sarcoma, a polymorphous-celled tumour in some areas frankly sarcomatous, in others showing more highly differentiated cells with well defined longitudinal and cross striation

This classification seems to us unsatisfactory, since these varieties of cells may all be present in a single tumour, the proportion of the different types varying greatly from case to case and also in the same case at different stages of its evolution. In our opinion tumours of striated muscle origin may be broadly divided into two groups, (1) those showing well defined cross striation and (2) those in which cross striation is lacking. The first group may be subdivided into (a) the simple rhabdomyomata composed wholly of well differentiated muscle fibres and devoid of primitive and anaplastic forms, and (b) the malignant rhabdomyoma or rhabdomyoma sarcomatodes, a pleomorphous round- and spindle-cell sarcoma showing well defined cross striation in at least a small proportion of the cells. The second group consists of cells whose staining reactions are those of muscle tissue and which morphologically resemble myoblasts of spindle shape and so-called hypertrophic type. These cells may either be completely devoid of striation or may show very delicate striation detectable only by special technique, *e.g.* Heidenham's iron hæmatoxylin with very careful differentiation. These growths are not highly pleomorphic, and in spite of the absence of striation their constituent cells are not very primitive and show little evidence of active mitosis. They correspond to Abrikossoff's first group and may be suitably designated simple myoblastomata. Hitherto the tumours recorded in this group have all been clinically simple, but in terms of the above definition we would include the one recorded by Muller (1917) as a rhabdomyoma originating in the skeletal muscles of the leg at the site of an old ununited fracture. This tumour failed to exhibit striation of any kind, but the morphology and staining reactions of the cells indicated their origin from striated muscle. The subsequent history of the patient after amputation of the limb is not recorded, but the appearances and clinical behaviour suggest that the growth was malignant and we would classify it as a malignant myoblastoma or myoblastoma sarcomatodes. To this group we add a case of myoblastoma of the tongue apparently of malignant character. While tumours of the first group are easily identified by their striation, the muscular nature of what Abrikossoff termed the pure myoblastoma may easily escape detection, and indeed it is doubtful if the existence of such neoplasms is generally accepted. If accepted, however—and we hope to add proof in our communication—the need for a properly descriptive designation is apparent and we suggest that the term myoblastoma should be applied only in

TABLE 1.—*Myelographic Diagnosis*

<i>Correct Myelographic Diagnosis</i>	<i>Cases</i>	<i>Total Decisions</i>	<i>Male Patients Cases</i>	<i>Male Patients Decisions</i>	<i>Female Patients Cases</i>	<i>Female Patients Decisions</i>
Normal myelogram, no lesion	2	2	1	1	1	1
"Positive" myelogram, 3 lesions	1	3	1	3	—	—
"Positive" myelogram, 2 lesions	9	18	5	10	4	8
"Positive" myelogram, 1 lesion	51	51	37	37	14	14
"Positive" myelogram, 1 lesion, plus 1 "false positive"	6	6	6	6	—	—
	69	80				
<i>Wrong Myelographic Diagnosis</i>	<i>Cases</i>	<i>Total Decisions</i>	<i>Male Patients Cases</i>	<i>Male Patients Decisions</i>	<i>Female Patients Cases</i>	<i>Female Patients Decisions</i>
Normal myelogram, 2 lesions present at operation	2	2	2	2	—	—
"Positive" myelogram, no lesions present at operation	6	6	3	3	3	3
"Positive" myelogram, 1 lesion, plus 1 "false positive"	6	6	6	6	—	—

gerous.)

9. The roentgenologist tapes lead skin markers to identify the right side and the individual vertebrae. The surgeons don protective gowns. Lights are extinguished. Glasses are raised.

10. The location of skin markers is determined fluoroscopically and corrected if necessary.

11. The oil is located, and the table is tilted (either way) slowly and gently. It is important to keep the 1/10 ounce of oil together in a fat little globule. If the globule becomes elongated to a thin string of radiopaque material, it cannot outline any masses that may be in the area.

12. In a lumbar myelogram, examination includes the caudal sac near the second sacral vertebra and extends cephalad at least two interspaces above the location of the lesion as specified by the physician. It is kinder and wiser for the physician to tell the roentgenologist where he may expect to locate the lesion.

13. Roentgen films are taken in the anteroposterior, left oblique and right oblique views of all suspicious areas.

14. The medium is placed under the spinal needle at conclusion of the myelographic procedure. When the fluoroscopic study is concluded, the room is lighted. Such oil as can easily be obtained is aspirated. If 2 cc. is obtained, it is considered plenty indeed. If only 1 drop is withdrawn it is accepted, and the patient is "needed" no more.

15. The patient is transferred supine to a litter and then to his bed, where he remains head down for at least four hours.

Material.—This series of myelograms was taken by one surgeon, with several roentgenologists. There are 125 cases, in which 76 patients were men and 49 were women. The average age of the men was 39 years; that of the women, 37.6 years. Of the 125 myelograms, there were 101 (82 per cent) that showed filling defects; 24, or 18 per cent, seemed normal. It may be interesting that the men had 65 positives and 13 negatives. Roughly then, a positive myelogram is obtained in 8 out of 10 cases when the cases are selected and a diagnosis made prior to the roentgen procedure.

with the old fibres. In Millar's experiments (1934) transverse striation reappeared much more quickly than in those of Forbus, who failed to demonstrate cross striation in the new fibres even after 22 days.

In the human subject, when the ends of severed fibres become embedded in new connective tissue resulting from the injury, there is often a striking development on the ends of the old fibres of large bulbous multinucleated masses which may be much vacuolated (fig. 30). At first the syncytial masses stain much less intensely than the normal fibres, but later they increase in staining intensity, and after a few days longitudinal striation may appear in the peripheral zone of some of them, others fail to show fibrillation. Transverse striation, however, remains in abeyance much longer and had not reappeared in examples we have studied of 12 and 20 days' duration.

We have thus the development from injured muscle fibres of giant or hypertrophic myoblasts which are often vacuolated and which may remain for some time devoid of striation. In these elements the nuclei are large, oval and vesicular, with a single very prominent chromatin nucleolus. They usually lie grouped in the centre of the plasmodial mass and become marginal again only as differentiation proceeds and myofibrils reappear in the cytoplasm. We believe that these structures are the homologues of the elements composing the myoblastomata of which examples are given below, there is no doubt that similar cells are found in the rhabdomyomata, together with more highly differentiated cells and also more anaplastic elements.

MALIGNANT RHABDOMYOMA (RHABDOMYOMA SARCOMATODES) OF THE SOFT PALATE

Case 1

Clinical history. W. S., a schoolgirl aged 10 years, was admitted to Arbroath Infirmary in 1928 with a nodular fleshy tumour, almost the size of a walnut, suspended by a short stalk from the soft palate in the mid line just anterior to the uvula. The cervical glands were not enlarged. The tumour was removed by the snare.

In October 1931, the patient was admitted to Dundee Royal Infirmary complaining of thickness of speech. Examination revealed a firm, painless, nodular tumour of pink colour attached by a narrow base in the mid line of the soft palate and extending as far forward as the margin of the hard palate, on the left side it covered the anterior pillar of the fauces. There was no palpable glandular enlargement. Removal by snare was again performed.

A second recurrence appeared about nine months later, when the patient's friends noticed her speech becoming thick. The patient did not feel anything unusual in her mouth, but on examination in October 1932 an extensive cauliflower growth was seen, involving the soft palate, covering the left tonsil and attached to the left posterior pillar of the fauces. On this occasion the tumour was removed by diathermy and radium applied

could be verified.

Five per cent of operative patients had tumors. Three were hemangiomas and 1 a teratoma of the filum terminale. Only 1 hemangioma and the teratoma were recognized as tumors from the myelogram before the operation.

The most common site of herniated nucleus pulposus is often said to be at the fifth lumbar disc interspace. This was not true in the series here reported. The fourth lumbar interspace was the most common site for myelographic filling defects (Table 2). This is not a study of surgical cases, but when the surgical data are considered, L5 is twice as frequent as L4 in women, and L4 is twice as frequent as L5 in men (Table 3). No interpretation of these findings is offered. Perhaps a larger series of cases would change the proportions.

TABLE 2.—Location of Defects by Myelogram

	Female Patients	Male Patients	Total
L1	—	1	1
L2	—	1	1
L3	5	10	15
L4	15	45	60
L5	18	19	37

TABLE 3.—Location of Lesions at Operation

	Female Patients	Male Patients	Total
L1	—	—	—
L2	—	1	1
L3	1	4	5
L4	7	32	39
L5	15	16	31

SUMMARY

Myelograms done in 125 consecutive cases are reported. Eighty-two per cent

of all showed positive filling defects. The agreement between clinical diagnosis and positive myelographic evidence is as follows: In 59 per cent the clinical diagnosis was confirmed exactly; in 19 per cent the location of the lesion was corrected; in 22 per cent the clinical diagnosis was confirmed and additional filling defects were present. The incidence of multiple defects was 22 per cent. In 12 cases there were "false positive" myelograms, and in 2 there were "false negative" myelograms, when checked by operation.

The accuracy of the myelograms is computed by the number of decisions made by myelogram and proved or disproved by operation. The myelogram is correct in 85 per cent of the cases.

The percentage of agreement of myelographic interpretation between radiologist and surgeon is 92 per cent.

The indications and contraindications for myelographic study are mentioned. Specific conditions are suggested. The procedure used in the series reported is outlined.

RÉSUMÉ

L'auteur présente les myélogrammes de 125 cas consécutifs. Dans 82% des cas des défauts de remplissage ont été constatés. Le rapport entre le diagnostic clinique et le myélogramme "positif" a été le suivant: 59% des cas ont confirmé le diagnostic clinique, 19% ont permis de corriger la localisation diagnostiquée et ont révélé des défauts de remplissage supplémentaires. La fréquence des lésions multiples a été de 22%. Il y a eu 12 cas de "faux myélogrammes positifs," et 2 cas de "faux myélogrammes négatifs" vérifiés à l'opération.

La précision des myélogrammes a été évaluée selon le nombre de conclusions opératoires dictées par .

is numerous in the left lung than in the right, and in the lower than in the upper lobes. The largest nodules form a row along the lower free margin of each lung. They project from 0.2 to 2 cm from the lung surface and vary from 0.2 to 6 cm in diameter, the smaller nodules being white and the larger reddish and more vascular. On section the tumour nodules are seen to be confined mainly to the lower margins of the lobes which they almost entirely replace. The larger nodules attain a diameter of 6 cm and many of them are hæmorrhagic and necrotic (fig 5). The smaller nodules are uniformly white and of fleshy consistence. The intervening lung tissue is congested and œdematous. The pleural lymphatic vessels are distended and prominent as white interlacing threads on the surface of each lung and the deep perivascular and peribronchial lymph channels are also permeated with new growth. The hilar lymph nodes of each lung are greatly enlarged and entirely replaced by rather necrotic tumour tissue.

Pharynx The soft palate shows slight scarring but is entirely free from tumour. The right tonsil and the uvula have been removed surgically and the operation sites are completely healed. Tongue, pharynx, larynx, œsophagus and trachea are normal. The cervical lymph nodes on the right side do not contain tumour, but on the left side the nodes in the anterior triangle are enlarged and form a roughly cylindrical mass measuring about 10 cm vertically \times 5 cm across. They are adherent one to another but preserve their individual outlines. On section they show dark hæmorrhagic centres surrounded by yellow necrotic tissue and a peripheral zone of pale fleshy tumour (fig 4). The left external jugular vein is surrounded by the metastatic nodules but is not invaded.

Abdomen The liver (3½ lb) contains no macroscopic tumour nodules. The gall-bladder is normal. The spleen (1 lb) is pale with septic softening. The kidneys (10 oz) show cloudy swelling and fatty degeneration, no pyelitis. Urinary bladder shows acute fibrinous cystitis. Uterus normal. Both ovaries contain metastatic tumour nodules, the right being almost entirely replaced by growth. The stomach and intestines show no lesion. The lumbar lymph nodes on both sides of the spine are infiltrated with tumour, largely hæmorrhagic and necrotic, and present two distinct enlargements, the upper and smaller at the level of the twelfth thoracic and first lumbar vertebrae, the lower at the level of the third and fourth lumbar, in both instances the mass on the left side is the larger (fig 2).

Spine The tumour has entirely replaced the bodies of the eleventh and twelfth thoracic and second and third lumbar vertebrae, with resulting collapse and compression of the spinal cord at these levels (fig 3). The bodies and spinous processes of the other lumbar

llenamiento adicionales. La incidencia de defectos múltiples fué 22 por ciento. En 12 casos hubo mielogramas "falso positivos" y en 2 casos mielogramas "falso negativos," como se comprobó en la operación.

La exactitud de los mielogramas se computó por el número de decisiones hechas con base en los mielogramas y comprobadas o no, durante la operación.

El mielograma estaba correcto en 85 por

ciento de los casos.

El porcentaje de casos en que al radiólogo y el cirujano coincidieron en cuanto a la interpretación de los mielogramas fue 92.

Las indicaciones y contraindicaciones para estudios mielográficos se mencionaron. Se surgieron condiciones específicas y se delineó el procedimiento usado en la serie reportada.

The great physician, Sir William Osler, who made his reputation in the United States and died at Oxford in the Regius Professorship of Medicine, was a famous bibliophile. As an impoverished medical student in Canada he began his collection with a copy of *Religio Medici* by Sir Thomas Browne and that volume was placed in his coffin at his death.

Even more than Bacon but in a very different way, Browne (1605-82) is a figure to conjure with. Profoundly religious, he was dangerously superstitious, at least as far as witches were concerned, and yet he seems to have been more subtly, penetratingly, interested in nature than was Bacon, and did more systematic observation and experiment. He was born in London, studied at Oxford and received his medical training and degree on the continent. Practicing medicine in the little town of Norwich, he kept out of the religious and political storms of the day.

His first book, *Religio Medici*, written for his own private satisfaction was first published without his permission in 1643. His fascinating and weirdly learned treatise on popular errors, *Pseudodoxia Epidemica* was published a few years later, and *Hydriotaphia* or *Urne-Burial*, and *The Garden of Cyrus* in 1658. Inspired by the discovery of some ancient sepulchral urns at Norfolk, Browne set down his wondrous reflections on funeral ceremonies, on immortality and annihilation. The final chapter may well be the most gorgeous prose in the English language.

—Houston

ever, to the highly recommended performance of a conservative operation whenever the condition of the adnexae allows it, preservation of ovarian function will aggravate the risk of hypertrophic lengthening of the cervix; it is no longer the anterior vaginal wall that is lowered—the cervix becomes inserted itself into the vulvar tear, causing it to gape, while the area of the isthmus and the deep scar of the cervix remain at about the same level. Estimation of this lengthening of the cervix is an essential part of the clinical examination in such cases; without it, one will always meet with failure.

In the second category (total hysterectomy) there is no support for the vaginal dome except the fibrocellular scar, which is usually sufficient to prevent prolapse. The highly important lowering of the vaginal walls, however — they are sometimes completely reversed, like the fingers of a glove—remains possible under three conditions:

1. When the greatest pressure is centralized on the axis of the vagina or on the vaginal scar, either by the viscera or by the intraperitoneal liquid output. In these circumstances the acute prolapse is a complication due to the intraperitoneal fluids.

2. When the vaginal walls are primarily thinned and loosened from the cellulomuscular tissue. The main role here is played by multiparity.

3. When the perineal fibromuscular fundus is insufficient, especially when the indispensable obliquity of the perineal angle has been suppressed.

There is a double aspect to the surgical problem in cases of prolapse following hysterectomy:

1. How to treat prolapse when it occurs. Is it possible to prevent prolapse by a modification of the technic of hysterectomy?

In my opinion the surgical indications after subtotal hysterectomy may be sum-

marized as follows:

Clinical study and examination by speculum may show a normal cervical stump, or the cervix may even be atrophied. There is no lowering of the cervix, even when the patient exerts violent abdominal pressure; there is only an unfolding of the anterior vaginal walls, with isolated or associated cystoectoceles. These conditions are always of obstetric origin and exist prior to hysterectomy. It is not a question, therefore, of prolapse following hysterectomy, but only of aggravation of a prolapse existing prior to the operation and overlooked. I have had 2 such cases. In this situation a simple colpoperineorrhaphy seems to be sufficient. It is the only type of case in which a purely muscular operation can be adequate, be it the Manchester, the Crossey Halban or any other technic. If the cervix is normal, I see no reason to amputate it. It has a possible physiologic role in the sexual equilibrium, and if it is preserved the patient will not feel physically diminished as she may feel after an amputation.

In other cases the cervix is only slightly lowered during abdominal pressure. The unfolding of the vaginal walls is little apparent. The cervix, however, is vertically stretched; it takes on the appearance of an elephant's trunk. In this case a greater or lesser colpoperineorrhaphy or even colpocleisis will bring about no valuable results. As long as the cervix remains, it will insert itself into the different vaginal planes and will cause recurrence of prolapse. The patient with whom I had the greatest trouble was in this category. I made the mistake of performing a tight classic colpoperineorrhaphy on a multipara, aged 40, who presented a prolapse of this type after hysterectomy, with preservation of the ovaries, for a fibroma. A prolapse occurred soon after, the cervix coming through the vulva less than one year after the operation.

processes, where they are separated by oedema and form an interlacing network (fig 8) Some of these cells are of great length, for example $75-150\mu$ long by $6-10\mu$ broad They are clearly muscle cells, and in them well marked longitudinal and cross striation can be demonstrated without difficulty, indeed this recurrence contains the best examples of striated cells among all the specimens from this case All stages in the ontogeny of muscle fibres can be seen, some cells show longitudinal myofibrils but no cross striation, such fibrils appearing first in the outer layers of the cytoplasm and later becoming so numerous as almost to fill the cell Cross striation also appears first in the outer layers Other fields show numerous broad, short, ribbon-shaped cells ("bandartigen"), many of which are multinucleated, with their nuclei situated centrally or at one pole These nuclei are often arranged close together in a single row, the larger in the centre, so that the whole group forms a cigar-shaped mass of nuclear material in which the individual nuclei can scarcely be distinguished (fig 22) Most of them are of vesicular type, with a large prominent karyosome, and the resemblance to the nuclei of the myoblasts of regenerating skeletal muscle is exceedingly close These cells measure $15-45\mu$ in length and up to 30μ in breadth, they are strongly acidophile Some are markedly granular while others contain vacuoles in addition to the granules, and in longitudinal section they present a striking appearance as multinucleated giant cells, these are clearly myoblasts Well marked longitudinal and sometimes concentric striations can be detected in these acidophile cells and all gradations can be demonstrated between them and the long muscle fibres Sections impregnated with silver show an abundance of long wavy argyrophile fibrils lying between the muscle fibres and the large spindle cells and forming a very close ensheathment of the individual cells Where the tumour cells are more anaplastic, as in the round-celled portions and in fields composed of the large myoblastic cells, reticulum is more scanty and groups of cells lie in its meshes, the impregnation thus brings out the alveolar arrangement of such portions

Second recurrence The specimen consists only of small polypoid fragments of tumour tissue, each covered by squamous epithelium, in places ulcerated Well formed capillary vessels are more numerous than in the original tumour and first recurrence, and again the tumour tissue is separated into strands by oedema Large spindle cells predominate, each with a large vesicular nucleus and prominent nucleolus, but occasionally cells with two nuclei are seen and mitotic figures are numerous Other fields contain young muscle fibres like those in the first recurrence, but their maximum length is about 75μ and they are not so strongly striated, they are frequently multinucleated with the nuclei situated at

stitches, the last one fixing what is left of the ligaments, round and uterosacral. I recover this zone with vesical peritoneum lifted in the Pestalozza manner to "blind out" the whole Douglas cavity and prevent reversal of the vaginal dome.

As I have stated, the treatment of prolapse following hysterectomy is not simple. It is therefore best to prevent prolapse in the first place. By application of the following principles, this, in my opinion, is possible:

1. Test the real value of the perineum and perform a complementary simple colpoperineorrhaphy during the hysterectomy if a perineal deficiency brings about a prolapse.

2. Prefer total to subtotal hysterectomy when there is hypertrophic lengthening of the cervix, especially if the ovaries are to be preserved.

3. Fix the cervical stump carefully if subtotal hysterectomy is performed, either by reimplanting the round ligaments on the stump or by performing the excellent Desmarests operation, to keep the tubes and the ovaries in their respective places and reimplant them in the surface of the stump section. This operation is possible in the surgical treatment of fibroma or even of an important infectious lesion of the tubes that does not require ablation. It offers not only excellent fixation, which prevents prolapse, but the possibility of maintaining some menstrual function.

4. In performing total hysterectomy it is still possible to fix the pedicles on the borders of the vaginal scar. It is easier to attend to this fixation during hysterectomy than to do it long afterward, when an obvious prolapse has occurred.

In order to prevent an eventual prolapse, it is useful to stitch the colic region to the bladder, which isolates the pelvis and prevents abdominal pressure on the vaginal dome. Always I operate in this way in case a vaginal drain is used.

SUMMARY

Vaginal prolapse after hysterectomy is provoked by perineal deficiency but not by perineal deficiency alone. When vaginal prolapse is clinically apparent, ordinary perineal operation is rarely sufficient.

In some cases one has either to treat hypertrophic lengthening of the cervix by complementary operation or to treat lowering of the vaginal dome by high abdominal fixation. Obliteration of the *cul de sac* of Douglas, according to the author, is the best way to solve these difficulties.

RIASSUNTO

Il prolasso vaginale, dopo isterectomia, è provocato da una deficienza perineale, ma non solo da essa. Quando il prolasso vaginale è clinicamente manifesto, ben raramente è sufficiente la sola operazione perineale. In alcuni casi o si deve correggere l'allungamento ipertrofico con una operazione o l'abbassamento della cupola vaginale con un fissazione addominale alta.

Secondo l'autore il miglior modo per ovviare a queste difficoltà è quello di obliterare il cavo del Douglas.

ZUSAMMENFASSUNG

Ein nach Gebärmutterresektion auftretender Scheidenvorfall wird durch Schwäche des Dammes aber nicht durch diese allein hervorgerufen. Wenn ein Scheidenvorfall klinisch in Erscheinung tritt, reicht eine gewöhnliche Dammoperation selten zu seiner Behebung aus.

In manchen Fällen muss man entweder die hypertrophische Verlängerung durch einen weiteren Eingriff oder das Sinken des Scheidengewölbes durch hohe abdominale Fixierung behandeln.

Den besten Weg, diese Schwierigkeiten zu beseitigen, sieht der Verfasser in einer Verödung des Douglasschen Raumes.

The Obstetric Importance of the "Long Pelvis"

H. KIRCHHOFF, M.D., F.I.C.S., AND H. KRAUBIG, M.D.

GOETTINGEN, GERMANY

IN studying the structural abnormalities of the bony pelvis in textbooks on Obstetrics, one notes that the rachitic respectively flat pelvis and the generally contracted pelvis are the most important deformities. The obliquely and transversely contracted pelvis is not as common a cause of complications.

In 1949 one of us (Kirchhoff) published a monograph entitled *The Long Pelvis* and added this formerly neglected variety of pelvic deformity to the types already generally known and recognizable by external inspection. For some time it had been well known to anatomists as "assimilation pelvis," though it is surprising that up to that time obstetricians had not paid adequate attention to it. In clinical studies comprising over 200 cases the obstetric importance of this type of pelvis was convincingly explained (Kirchhoff, 1949). Therefore, knowledge of hitherto inexplicable obstetric complications in the sense of a standstill or of an unclear pathologic type of development was enlarged.

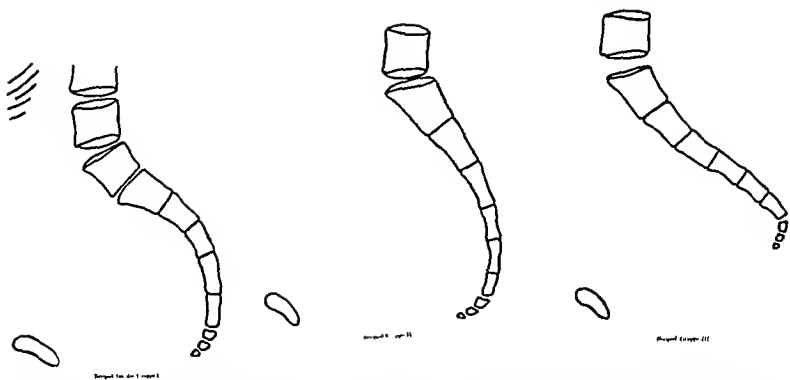
The functional importance of an assimilation pelvis can be interpreted roentgenologically only in connection with the clinical picture.

"Assimilation" refers to an anatomically conditioned peculiarity of the vertebral column. One vertebra takes the place of a vertebra of an adjacent part of the vertebral column, and resembles it. Obstetricians are naturally especially interested in abnormalities of the lumbosacral region in its relation to a low or high as-

similation pelvis. The question of the functional importance of the vertebra concerned is of the utmost importance; i. e., whether or not this vertebra already belongs to the pelvis and is thereby decisively influencing the shape of the pelvic inlet. An answer to this question can be expertly given by a lateral roentgenogram taken by the Guthmann method. Only in this way is it possible to see whether the "lumbosacral transitional vertebra" and the sacrum are forming an important functional obstacle by limiting the birth canal. The degree of assimilation recognizable in the anteroposterior roentgenogram in no way influences the position of the transitional vertebra; the two are entirely independent of each other. The last lumbar vertebra may belong functionally to the sacrum without showing any signs of assimilation ("functional high assimilation"). Kirchhoff's detailed obstetric-clinical and informative roentgenologic studies resulted in a typical and reiterating syndrome. If the transitional vertebra tends more toward the sacrum, visible by the greater inclination of its anterior surface toward the symphysis, one finds a remarkable elongation of the bony birth canal by one vertebral body, i. e., practically by 2 to 3 cm. The pelvis becomes too long. This characteristic, which has functional importance, led to the conception of the "long pelvis." There are, however, other noteworthy peculiarities.

If another vertebra is added to the sacrum, the promontory is elevated (high promontory); the plane of the pelvic inlet is correspondingly tilted, and the pelvic inlet changes its shape. In these cases the

From the Women's Hospital of the University of Goettingen.
Submitted for publication Dec. 30, 1956.



Left, example of "long pelvis," Type 1. Fifth lumbar vertebra has expressively sacral tendency. Double promontory easily recognizable. Plane of superior straight is steep. Smallest diameter below promontory 1. External measurements within normal limits. *Center*, example of "long pelvis," Type 2. High promontory, steep pelvic inlet. Only one promontory, sacrum elongated and flattened, sacral concavity still existing. *Right*, example of "long pelvis," Type 3. Promontory is nearly straight above symphysis. Sacrum totally straightened, forming a "one-way street" without curves. Smallest diameter far below promontory. Disproportion in spite of long conjugata vera.

It is interesting that, at the same time, American authors (Caldwell and Moloy), studying the pelvis, also came to conclusions which to a great extent are in accordance with those aforementioned. They distinguish four different types of pelvis. Their "anthropoid" type corresponds with the special pelvic type described by myself. They also stressed the length of the pelvis and the fact that the pelvic inlet appears, anteroposteriorly, more or less like an oval. They also pointed out the high frequency of complications *sub partu*.

I myself distinguish three different types of long pelvis, which differ in their obstetric importance.

Type 1 (see illustration, A).—Assimilation-transitional pelvis: Only the lumbo-sacral transitional vertebra with sacral character has functional importance: high promontory, double promontory, false conjugata vera I. The birth canal is elongated, the plane of the superior straight diameter is steep.

Type 2 (see illustration, B).—Assimilation pelvis with unchanged shape of sacrum (6 sacral vertebrae); assimilation vertebra belongs anatomically and functionally to the normally shaped sacrum. Only one promontory forms the narrowest diameter. There is certain flattening out of the sacral concavity. The pelvis is elongated with a steep pelvic inlet and a high promontory.

Type 3 A (see illustration, C).—Assimilation-canal pelvis with 6 sacral vertebrae; the most outstanding type of long pelvis. Additional elongation due to stretching of the sacrum, missing sacral concavity. Promontory remarkably high; very steep pelvic inlet. Length of conjugata vera I above average, "true" obstetric conjugata vera (conjugata vera II) situated between the first and second sacral vertebrae, often shortened.

Type 3 B.—Canal pelvis with 5 sacral vertebrae and with a probable but not proved assimilation: Canal hape o vis

and small groups of tumour cells and gives an alveolar architecture (fig 17) This is worthy of emphasis, as the resulting appearance is indistinguishable from that of anaplastic carcinoma The pulmonary secondaries also consist chiefly of undifferentiated round cells, with a few large multinucleated cells and small myoblasts as in the lymph-node metastases, which they resemble very closely (fig 16) Lymphatic permeation is conspicuous both in the superficial pleural and deep perivascular channels The larger nodules completely replace and destroy the pulmonary architecture, and in general present a poorly defined alveolar structure, which is emphasised by impregnation of the reticulum The structure could readily be misinterpreted as secondary anaplastic carcinoma

In all the metastases blood vessels are numerous and are of thin-walled type, especially in the lungs Many contain tumour cells in their lumen, others are thrombosed, and areas of old and recent hæmorrhage are frequent

Case 2

Greig (1917) reported from this department a tumour of the soft palate presenting clinical features resembling so closely the above example that we have reinvestigated the case The growth was reported as a myxo-sarcoma, but in a personal communication, Greig acknowledged the possibility that it might be of the same nature as in the case above described, a suspicion previously entertained by Martin and Alexander (1924) In his original communication Greig commented upon the lobulated appearance as an unusual feature in sarcoma, and compared his case to the racemose sarcoma of the cervix uteri and to certain sessile tumours of the urinary bladder It is significant that both of these neoplasms are usually rhabdomyomata Re-examination of a section of Greig's tumour shows clearly that it is a rhabdomyoma

Clinical history J R, male, æt 13 years, was seen by Mr Greig on account of a tumour of the palato Four years previously thickness of speech had been noticed and a small tumour was then removed by another surgeon under local anæsthesia The growth recurred and was again removed a year later, the base being cauterised, but further recurrence followed On examination by Mr Greig the entire soft palate, uvula and posterior half of the hard palate were covered by a flattened papillomatous growth, composed of many coarse lobules each attached by a broad base The free ends were thicker than the attached, giving the lobules a clubbed appearance The whole mass was freely excised together with the anterior pillars of the fauces and right tonsil (fig 18) A small recurrence developed four months later, this was again excised freely and there was no further local trouble, but a mass appeared on the left side of the neck just below the ear and this too was removed The late Professor Sutherland reported the primary tumour as a myxo sarcoma and the recurrence in the neck as spindle cell sarcoma The patient died with signs of pulmonary metastases about nine months later, i.e. about six years after the onset of the condition

which he is justified in considering a pleasing result of the practical benefits derived from the new-found knowledge of the long pelvis (see table).

During the past few years a number of others—H. Walter, H. O. Kleine, Fochem, Froewis and Narik—have written about this type of assimilation pelvis. All of these authors confirmed the importance of the newly described pelvic abnormality by observations of their own, and were unanimous in pointing to the high frequency of operative complications. H. O. Kleine stressed the peculiarities and practical importance of the conjugata vera and the conjugata diagonalis. In the newest edition of his *Textbook of Obstetrics* H. Martius also added this special pelvic type to the list of abnormalities of the bony pelvis, thereby introducing it into the field of clinical instruction.

In what percentage of cases does one encounter a long pelvis? This question can be answered only indirectly and with great reservation. It may be assumed that, taking all pathologic types of pelvis together, the percentage of the long pelvis is about 40 per cent and therefore equal to the incidence of the rachitic pelvis.

With respect to the genesis of the long pelvis, the results of orienting studies on postnatal pelvic development implied that this type of pelvis is caused by a general, apparently hormonally conditioned, arrest of development. The observation that a great percentage of the patients suffer from an ovarian insufficiency speaks in favor of this explanation. Examinations of relatives made it certain that hereditary factors also play a certain part in producing variations in the different segments of the vertebral column.

There is no doubt that the long pelvis, as a variety of the assimilation pelvis, has a special importance. Knowledge of this type of pelvis with its different trouble

points and with the serious complications arising therefrom, should be a part of every obstetrician's training. It represents a recent theoretic achievement of practical importance.

SUMMARY

In addition to the hitherto well-known anomalies of structure of the bony pelvis there is the "Assimilationsbecken," which has some practical importance. This is called by the author "long pelvis." It can cause serious complications, which knowledge of its nature and existence enables one to foresee and prevent. The anomaly is not uncommon and is best diagnosed by means of lateral roentgenogram.

RIASSUNTO

Accanto alle già note anomalie del bacino osseo, anche al "bacino di assimilazione" di Kirchhoff, detto anche "bacino lungo," spetta un'importanza praticamente notevole. Molteplici fenomeni di disturbo possono causare gravi complicazioni, che però sono evitabili ove si conosca questa forma di bacino che si presenta tutt'altro che raramente. La diagnosi è finora possibile solo attraverso i raggi, per mezzo di una radiografia laterale.

ZUSAMMENFASSUNG

Neben den bisher bekannten Bauanomalien des knöchernen Beckens kommt dem Assimilationsbecken, von Kirchhoff auch als "Langes Becken" bezeichnet, eine praktisch wichtige Bedeutung zu. Mehrfache Störungsmomente können schwerwiegende Komplikationen bedingen, die aber bei Kenntnis dieser keineswegs selten auftretenden Beckenform vermeidbar sind. Die Diagnose ist bisher nur röntgenologisch durch eine seitliche Aufnahme zu stellen.

later the tumour had spread into the nasopharynx and pharyngeal muscles, involved the left maxillary antrum and formed a polyp in the left ear. Exposure to radium produced definite improvement and the swellings in the neck and pharynx almost disappeared. Death occurred from œdema of the larynx six months after removal of the original tumour.

Microscopically the original tumour was covered by squamous epithelium, it was not very vascular, there was no hemorrhage and connective tissue was scanty. The structure varied greatly in different areas: some were "myxomatous," others consisted only of spindle shaped cells, but elsewhere there were true myogenic cells, some of which resembled adult muscle and showed longitudinal and cross striation. Large acidophile multinucleated cells were numerous and assumed various forms: some had long fibrils, others were of tadpole shape with striations in the tail, some were rounded, with concentric striations, and some were "spider cells." No sarcolemma could be identified. Staining for fat and glycogen was omitted. Tissue excised from the recurrent tumour five months after the removal of the original growth showed a more aberrant structure and, if the nature of the tumour had not been determined previously, might have been called a spindle cell sarcoma. A cervical lymph node also examined was replaced by spindle cell sarcoma, among which were a few partially differentiated muscle cells.

At autopsy, the tumour had invaded the left side of the neck widely and had spread into the parotid and mastoid regions. The lymph nodes on the left side of the neck were involved, those in the posterior triangle only slightly, the lowest gland affected was situated between the two lobes of the thymus. The left submaxillary salivary gland was intact, although the muscles surrounding it were invaded. On the right side several superficial and deep glands were involved. The growth everywhere was creamy white in colour and mainly rubbery in consistence. There was an entire absence of hemorrhage and gross necrosis: there were no visceral metastases. Microscopically, the autopsy material maintained the undifferentiated appearance of the recurrent local tumour.

These two cases, together with our own, form so far as we can ascertain, the complete bibliography of recorded rhabdomyoma of the soft palate. We have referred to them at some length, as in our opinion the external appearance of the tumours warrants emphasis. In all cases they assumed a nodular, polypoid form, were of white or fleshy colour and somewhat translucent, and looked soft but actually were firm to the touch. All four grew rapidly and were recurrent: three are known to have produced metastases, one in the lymph nodes and by direct invasion of contiguous tissue, two by both lymph and blood stream with, eventually, visceral metastases. Microscopically there are features of close similarity. Martin and Alexander emphasise the variations in structure in different portions of the same growth, and remark that from a limited examination some areas might have been mistaken for myxoma. Later the tumour became more spindle celled and de-differentiated, as we also have observed. In our first case the growth finally reverted to a round-cell type reminiscent of the earliest stages in the embryonic development of the myotomes,

Ophthalmologic Surgery

Hypotony Following an Intraocular Surgical Procedure

EVERETT R. VEIRS, M.D., D.A.B.

TEMPLE, TEXAS

HYPOTONY is a rather consistent occurrence after intraocular surgical operations, especially those performed for cataract or glaucoma. In most instances hypotony is not a cause for alarm, as normal intraocular pressure eventually is reestablished with no permanent visual loss. Complications do result in a small percentage of cases, especially when hypotony is accompanied by prolonged flattening of the anterior chamber. The hypotony resulting from loss of vitreous is not included in this article.

The frequency with which hypotony follows the extraction of cataract has been amply demonstrated by Hilding,¹ who observed it so regularly after the twelfth day that its occurrence is now considered the rule rather than the exception. I agree with Hilding¹ that this sequence of events is frequent, whether there is a flattened anterior chamber or not. The same holds true following operations for intraocular glaucoma. Postoperative checks of intraocular pressure show that hypotony frequently lasts for three or four weeks. In the absence of prolonged flattening of the anterior chamber, the intraocular pressure will return to normal limits without any permanent damage to the eye.

Hilding¹ postulated that the trauma, accompanied by edema or hemorrhage or both, that is incidental to the extraction of a cataract causes a disturbance of the electrical potentials between the stroma and the epithelium. As a result, there is interference with the production of aqueous, and the rate of outflow of aqueous is reduced, owing to general congestion. Bellows and his co-workers² suggested that a pronounced diminution of the flow of aqueous may be an important cause of prolonged flattening of the anterior chamber. They expressed the opinion that, because of the pressure gradient between the posterior and the anterior chamber, a transient lack of the aqueous causes the vitreous to be drawn firmly against the iris, thus obstructing the free passage of aqueous from the posterior into the anterior chamber. As the aqueous is thus prevented from entering the anterior chamber, the pressure gradient increases. This places the hyaloid membrane and the vitreous still more firmly against the iris until complete obstruction occurs. With this pupillary block, the back pressure in the posterior segment interferes with uveal circulation, which in turn results in diminished aqueous formation.

I agree with Hilding¹ and Bellows² that diminished formation of aqueous is a cause of postoperative hypotony. In some instances, perhaps, both theories of postoperative hypotony are at least partially

From the Department of Ophthalmology, Scott and White Clinic, Scott and White Memorial Hospital, Scott, Sherwood, and Brindley Foundation, Temple, Texas.

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.

Submitted for publication Jan. 2, 1957.

Individual cells average $60\ \mu$ in length and $12\ \mu$ in width, but some are of great length, measuring $160\ \mu$ or more, chiefly owing to the presence of very long tapering processes (fig 26). Some of the strap-like cells show the crinkled appearance of their extremities which is so characteristic of striped muscle fibres in paraffin sections. Occasionally one end of the cell expands in a fan-shaped process in which longitudinal striation is usually distinct. The cells are mostly mononuclear, mitoses are not numerous and multinucleated cells are infrequent, but a few syncytial masses with numerous centrally placed nuclei are found (fig 23), these are entirely comparable to the hypertrophic myoblasts of other cases. The nuclei are large and oval with rounded ends, they stain fairly deeply, with many chromatin knots, but the karyosome is usually very prominent. They usually occupy the greater part of the width of the spindle cells and often the cell body expands around them (fig 28). An unusual feature of the deeper parts of the tumour is that the cells appear to branch and join one another obliquely, thereby producing small clear spaces of irregular shape between portions of adjacent cells (fig 27). The cytoplasm of the cells is in general strongly acidophile, showing a brownish-yellow colouration with van Gieson and taking the acid fuchsin of Mallory's stain, which in addition demonstrates a delicate sheath around many of the strap-like and spindle cells (fig 28). In places the larger myoblast-like cells show pronounced vacuolation of their cytoplasm, but as none of the tissue was preserved in alcohol we were unable to test for glycogen. Here and there in the superficial portions of the tumour some of the larger elements with vacuolated cytoplasm resemble spider cells, the intervacuolar cytoplasm and the periphery of the cell bodies showing, in preparations stained by Heidenhain's iron hæmatoxylin, rows of darkly stained paired dots connected by delicate threads (fig 29). These resemble the paired centrioles described by Wolbach (1907) in congenital rhabdomyoma of the heart and regarded by him as the earliest precursors of myofibrils. Fine longitudinal striation is well marked in the strap-like cells and in the tapering processes of some of the larger spindle cells and their fan-shaped expansions, but cross striation cannot be detected. In some of the spindle cells the cytoplasm consists of numerous rather coarse, darkly staining longitudinal fibrils with some paler staining cytoplasm between (fig 23). In the base of the tumour there are bundles of smooth muscle fibres belonging to the bladder wall. These are separated by oedematous connective tissue through which the neoplastic cells appear to be spreading deeply into the wall of the viscus, so that had the patient recovered, simple removal of the growth would probably have been followed by recurrence. We propose to classify the growth as a myoblastoma. It is noteworthy that



Fig. 3.—Hypotony of forty-eight hours' duration. Rabbit eye shows congestion and edema of ciliary body.

this transudation of fluid.

Heath⁵ listed many pathologic changes that occur in eyes with hypotony. The symptoms of hypotony following an intraocular surgical procedure are primarily those of irritation. Lacrimation is frequent. The eyeball is injected, and this condition often is accompanied by edema of the eyelids. The corrected vision is always subnormal. The disappointing vision one occasionally obtains three to five weeks after extraction of a cataract may well be attributed to the fact that the intraocular pressure is still subnormal.

The flattening of the anterior chamber sometimes associated with hypotony may become a serious matter if allowed to persist too long. Kronfeld⁶ noted that absence or near-absence of the anterior chamber occurred in 11 per cent of 749 cases of extraction of uncomplicated cataract. He concluded that delayed or disturbed healing of the operative wound is the principal cause of delayed restoration of the chamber.

Chandler⁷ strongly emphasized the importance of a tight closure of the wound

with scleral sutures when doing a peripheral iridectomy for narrow-angle glaucoma. Barkan⁸ described a method of peripheral iridectomy for narrow angle glaucoma that insures retention of the chamber and prevents later leakage from the wound. In Barkan's technic,⁸ not only is the possibility of synechia at the angle minimized because the anterior chamber is retained but hypotony, with its potential ill effects, is prevented. Hypotony in cases of narrow-angle (closed angle) glaucoma is especially undesirable, assuming that the resulting pathologic changes in the ciliary body and the iris cause diminution of aqueous formation. The result of this would be prolonged flattening of the anterior chamber with further adhesions at the angle. In my own opinion, the lack of aqueous formation rather than a leaking wound only is the cause of prolonged flattening of the anterior chamber after an iridectomy for narrow-angle glaucoma, or that at least it is aggravated by this lack.

What is the cause of flattening of the anterior chamber after extraction of cataract? The eyes are soft, but the pressure in most eyes is subnormal for many days

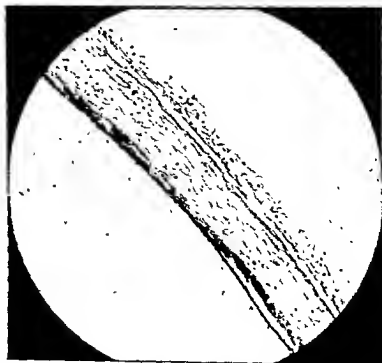


Fig. 4.—Hypotony of twenty-four hours' duration. Rabbit eye shows congestion of choroid.

fine longitudinal striation is sometimes distinctly visible but transverse striations cannot be demonstrated. The tumour cells are chiefly mononuclear, but mitotic figures are not uncommon and cells with large convoluted nuclei and even multinucleated syncytial masses are occasionally seen. The individual nuclei are large and oval, with many chromatin nodes, and usually a single chromatin nucleolus is a prominent feature. The resemblance to myoblasts as seen in other situations is very close, both from the morphological and tinctorial aspects, the only evidence lacking being the demonstration of frank cross striation. In some parts of the tumour, however, Heidenham's iron hæmatoxylin reveals darkly staining longitudinal fibrils in the outer layers of cytoplasm of the spindle cells and in some of the large myoblasts. These fibrils are very delicate, some are straight, others wavy, and they may run the entire length of the cell body or lie only in one end (fig 32). They are usually homogeneous but occasionally show a faintly beaded appearance. A number of fibrils may lie close together and exhibit beading which amounts almost to primitive cross striation and which closely resembles the appearances seen in tissue cultures of heart muscle and in sections of very early human embryos. In our opinion these structures can only be interpreted as myofibrils and they are strong corroborative evidence of the origin of this growth in striated muscle elements. The tumour may be suitably designated a myoblastoma. Despite considerable variation in cellular character throughout the growth there is a striking absence of the nests of primitive round cells seen in the palatal tumours, and the least differentiated elements appear to be the spindle cells which resemble smooth muscle, especially in the central part of the growth.

Commentary

Although rhabdomyomatous tumours of the uro-genital apparatus are relatively numerous in both sexes, the urinary bladder is one of the less frequent sites.

Vesical new growths with double striation have been reported in children by several observers (Cattani, 1884, Vincenti, 1887, Parvone, 1898 (all quoted by Hüsler), Hüsler, 1905, Shattock, 1909, 10, Stumpf, 1911). Mönckeberg (1907) described a polypoid tumour of the trigone in a woman of 23 years, containing long fibre-like cells devoid of striation and short tubular cells—myoblasts—with striation in their margins. The growth did not recur after removal. Both in its clinical and pathological features this case bears a strong resemblance to the two cases presented above.

MacKenzie and Chase (1928) published an account of an unusual metastasising rhabdomyoma of the bladder in a woman of 69 years. Cross striation could not be demonstrated in the primary growth but was observed in the metastases. Houette (1929) reported a rhabdomyoma in the wall of a congenital diverticulum of the bladder, it was remarkable for the

chia forms very quickly and will always result in secondary glaucoma unless the condition is recognized and corrected. A small needle knife opening through the iris is sufficient.

The use of Diamox in flattened anterior chambers, as recommended by Agarwal and his associates¹⁰ has not been effective, but I have not tried this method of treatment in many cases.

In cases of flattened anterior chambers, Armstrong¹¹ has recommended a few drops of plasma over the incision, and the addition of 1 or 2 drops of "Thrombin, Topical" solution (1,000 units per milliliter). The eye is left open for one to two minutes to allow the clot to become firm; the upper lid then is lifted gently over it and left undisturbed for twenty-four hours.

SUMMARY

Hypotony of several days' to several weeks' duration following an intraocular surgical procedure is a consistent occurrence. The hypotony, in most instances, will disappear spontaneously without permanent damage unless there are complicating factors, such as a flattened anterior chamber.

Apparently the sudden loss of intraocular pressure that occurs with the opening of an eyeball causes transudation of fluid, congestion and hemorrhages. This occurs because the intravascular pressure within the eye remains normal as the intraocular pressure drops to zero.

The diminution of aqueous formation is a major cause of postoperative hypotony and is due for the most part to the edema, congestion and hemorrhages that occur within the ciliary body and the iris. A major factor in prolonged flattening of the anterior chamber is probably the result of this diminution of aqueous formation. This applies especially when a demonstrable leak cannot be demonstrated or when

no pupillary block is present.

RÉSUMÉ

Les opérations chirurgicales intra-oculaires sont fréquemment suivies d'un état d'hypotonie de plusieurs jours à plusieurs semaines; celui-ci disparaîtra spontanément dans la plupart des cas sans laisser de lésion permanente, à moins de complications, tel—par exemple l'aplatissement de la chambre antérieure.

La baisse soudaine de la pression intra-oculaire au moment de l'incision du globe oculaire, provoque apparemment une transsudation de liquide, ainsi que de la congestion et des hémorragies, dues au fait que la pression intravasculaire de l'oeil reste normale, alors que la pression intra-oculaire tombe à 0.

La diminution de la formation d'humeur aqueuse est une des principales cause d'hypotonie post-opératoire; elle est, en majeure partie, due à l'œdème, à la congestion et aux hémorragies se produisant à l'intérieur du corps ciliaire et de l'iris. Un des facteurs principaux de l'aplatissement prolongé de la chambre antérieure est probablement la conséquence de la diminution de la formation de liquide.

RIASSUNTO

Dopo gli interventi endoculari l'ipotonìa è una eventualità pressochè costante per periodi di durata variabile. In molti casi scompare spontaneamente senza lasciare danni definitivi, a meno che non vi siano altre complicazioni come il collasso della camera anteriore.

La perdita improvvisa della pressione endoculare che si verifica con l'apertura dell'occhio causa trasudamento di liquido, congestione ed emorragie. Questo avviene poichè la pressione intravasale rimane normale mentre quella intraoculare è caduta a zero.

index and middle fingers still tingled when struck. The nodule, which had been extremely tender prior to the operation, had "disappeared." Positional changes that caused cramping in the hand, noticed before the operation, had also disappeared. The tips of the thumb, index and middle fingers were still sensitive; there was an occasional "drawing" in the wrist, but the "burning" in the fingers had improved to a pronounced degree. The patient considered himself improved. On physical examination, the significant signs were hypesthesia over the proximal volar portions of the index and ring fingers and hypesthesia distal to this, with normal sensation over the thenar eminence, but hypesthesia over the midvolar surfaces of the phalanges of the thumb. The scar was well healed, nonadherent and just ulnarwards to the thenar crease, extending distally to the midpalm. Some increased weakness in the grip of the left hand was noted, and there was some dryness of the index and middle fingers. No abnormal masses were palpated.

A month after this consultation an ill-defined, pea-sized nodule was observed over the midportion of the scar, and this was judged to be induration about the scar. Pain and tenderness recurred along sensory branches of the median nerve, frequently during the day, and sensory loss in the tips of the thumb, index and middle fingers had become pronounced. A month later the small nodule had become considerably larger and was now present over the distal half of the surgical scar. It was $1\frac{1}{2}$ inches (3.7 cm.) in diameter, not adherent, not moving with finger motions, not pulsating or fluctuating and not extremely tender except on extremely deep pressure. Roentgenograms revealed a large soft tissue mass with a trace of calcification.

On December 28 exploration revealed a moderately firm, brownish-red mass about 3 cm. in diameter, deep to the palmar fascia overlying the adductor of the thumb and the first lumbrical, and apparently incompletely encapsulated. A portion was subcutaneous, distal to the palmar fascia, volar to the first lumbrical tendon and the second metacarpal head. Pathologic examination revealed fibrosarcoma arising in the soft tissues of the hand and revealing many mitoses, anisocytosis, with variations in staining properties, and many areas showing abnormal, rounded nuclei.

On December 30 amputation was performed through the midpart of the left arm. Dissection of the specimen revealed that the neo-

plasm had not extended to within 1.5 cm. of the transverse carpal ligament and that the epitrochlear nodes were not involved. Up to the time of writing no metastasis has occurred.

Clinical Evidence.—About 5,000 years ago a mammary tumor was reported¹ as possibly due to trauma. Controversy has been voluminous since on the possible relation of trauma to new growth. Maude Slye² reported on the frequent occurrence of sarcomas at the sites of wounds in mice (later denied by Curtis³). The increased incidence of sarcoma occurring in "war injuries," in which considerable mechanical damage, infection, suppuration and splinters had exerted an effect over a long period, was conceded by Hellner,⁴ who denied that single trauma could cause osteogenic sarcoma. Gillis and Lee⁵ had described 24 cases of carcinoma arising in sinuses and scars in World War II wounds, whereas Melzner⁶ reported on infrequent sarcoma following World War I wounds, and Hamant⁷ reported likewise. Von Hanseemann,⁸ Gruber,⁹ and Pick¹⁰ noted no increase in tumor formation following these wounds. Stout¹¹ reported that in 36 of 66 cases of fibrosarcoma of the extremities the tumor developed in a scar.

Whereas Hellner⁴ denied the possibility that a single trauma could cause giant bone cell tumor or osteogenic sarcoma, Inclan¹² reported in detail 3 cases of giant cell tumors of the knee following falls and knee injuries after several months, and Pack and Braund¹³ described 3 cases of osteogenic sarcoma developing in traumatic hemothorax and hematoma of the thoracic wall.

Earlier reports (e.g., Lowenstein¹⁴) indicated that from 5 to 16 per cent of patients with sarcoma had a history of single trauma, but the evaluation of the history was usually inadequate. To add to the difficulties in evaluating this problem, after Meyerding¹⁵ noted a relation between trauma and the development of fibrosar-

Mobilization of the Stapes for Improvement of Defects in Hearing Due to Clinical Otosclerosis

C. M. KOS, M.D., F.A.C.S., F.I.C.S.

IOWA CITY, IOWA

MOBILIZATION of the stapes practiced during the late nineteenth century,¹ discarded and recently revived,² is a subject of considerable interest to the medical profession as well as to some millions of those whose hearing loss is potentially reversible. It is, in addition to the fenestration operation, a possible therapeutic tool for the improvement of hearing in those whose loss is consistent with the diagnosis of clinical otosclerosis.³

Otosclerosis commonly causes varying degrees of stapedial ankylosis. Impairment in the mobility of this essential link in the ossicular chain results in a mechanical defect of the hearing system, which may be recognized audiometrically as tympanic deafness, or deafness of the middle ear (Fig. 1).

In tympanic impairment of hearing the bone conduction (BC) thresholds according to pure tone audiometric tests are normal or variably increased, depending upon the degree of neural degeneration. The air conduction (AC) thresholds are elevated to a level proportional to the degree of stapedial fixation, but not exceeding 50 to 60 decibels without some loss of bone conduction acuity. When the maximum loss in air conduction acuity is reached the stapes is generally considered to be firmly fixed, at least so far as sound pressure excitation is concerned. However, when

the air-borne conduction thresholds do not differ by more than 30 decibels, the stapes may be only partially fixed (Fig. 2). The difference between the air conduction and the bone conduction thresholds is referred to as the cochlear reserve (CR) and indicates the potential of improvement in hearing, were the mechanical defect of stapes fixation to be corrected. In addition, the bone conduction threshold indicates the degree of normal hearing to be restored if the stapes can be completely mobilized. Thus, by mobilization of the stapes, it is possible to improve hearing to levels equal to the neural function or the bone-conduction thresholds (Fig. 3, A and B). In some instances this represents nearly normal hearing (Fig. 4, A and B).

Selection.—It is apparent that at least three categories of clinical otosclerosis are suitable for treatment by mobilization of the stapes. The first is classified on the basis of normal bone conduction thresholds for pure tone audiometry (bone conduction at 2,000 cycles not lower than 20 db.).

1. Normal bone conduction; cochlear reserve 25 db. or more (Fig. 5, A and B)
2. Bone conduction loss less than 30 db.; cochlear reserve 25 db. or more (Fig. 6, A and B)
3. Bone conduction loss greater than 30 db.; cochlear reserve 30 db. or more (Fig. 7, A and B)

From the Department of Otolaryngology and Maxillofacial Surgery, State University of Iowa, University Hospitals, Iowa City, Iowa.

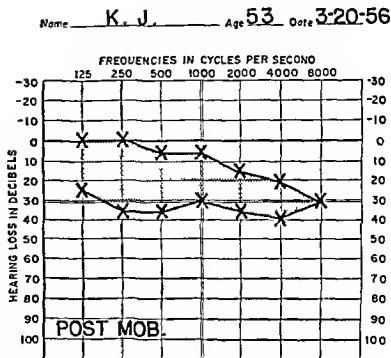
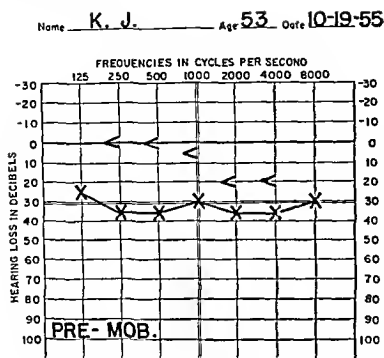


Fig. 3.—A, mobilization of stapes of left ear, Oct. 20, 1955. B, most recent audiogram, showing magnitude of sustained improvement.

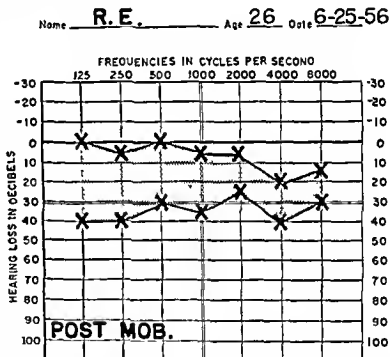
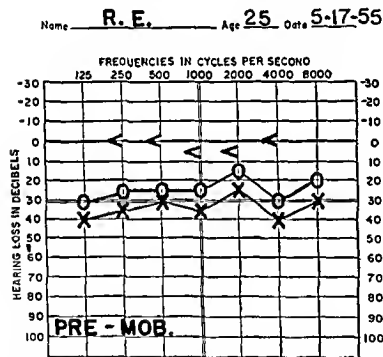


Fig. 4.—A, mobilization of stapes of left ear, April 18, 1955. B, most recent audiogram, showing magnitude of sustained improvement.

except a protective antibiotic, is prescribed.

Anesthesia is obtained by undermining the cutaneous external auditory canal with 0.2 to 0.4 cc. of 4:1 combination of 2 per cent zylocaine and 1:1,000 epinephrine introduced with a 0.5 cc. tuberculin syringe and a 26-gauge short beveled hypodermic needle. One injection is made at the posteroinferior junction of the carti-

laginous and osseous portions of the external auditory canal, in the tympanomastoid suture. Thus the entire posterior and inferoanterior canal wall and the adjacent portions of the tympanic membrane are completely anesthetized.

A peritympanic incision is made in the posterosuperior canal wall, extending from the 11 o'clock position to the 8 o'clock position in the right ear and from the 1

PLATE LIX

RHABDOMYOMA AND MYOBLASTOMA

- FIG 22—Case 1 Rhabdomyoma sarcomatodes of soft palate, first recurrence. Myoblasts of various types, some fully striated, some showing longitudinal and marginal striation, others with marked granularity or vacuolation of the cytoplasm. Note the characters of the nuclei. $\times 275$
- FIG 23—Case 3 Myoblastoma of bladder. An area consisting of spindle shaped myoblasts, some with longitudinal striation. One multinucleated "hyper trophic" myoblast lies in the centre of the field. Note the nuclear characters. $\times 380$
- FIG 24—Case 4 Myoblastoma of bladder. Large spindle shaped myoblasts, most of which show longitudinal striation, but some have granular cytoplasm. The inflammatory infiltration is due to the proximity of the ulcerated surface. $\times 380$

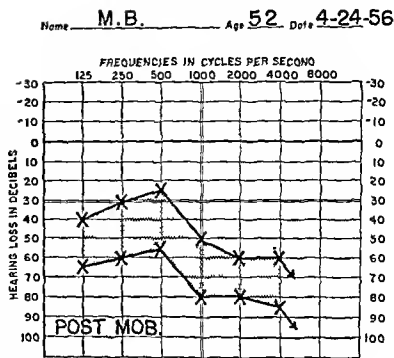
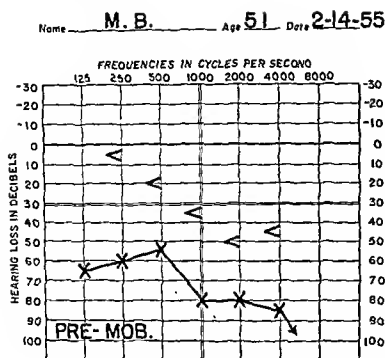


Fig. 7.—A, mobilization of stapes of left ear, Feb. 15, 1955. B, most recent audiogram, showing magnitude of sustained improvement.

brane, which is reflected anteriorly and inferiorly enough to expose the lenticular process of the incus, the lenticulocapitular joint, and the stapedia muscle tendon (Fig. 8C). Additional exposure may be obtained by lifting the chorda tympani from its annular bed and reflecting it anteroinferiorly. Occasionally it is necessary to remove about 1 mm. of osseous annulus to obtain adequate exposure. Thus the lenticulocapitular capsule is presented, through which a sharp-pointed shaft may be inserted to engage the head of the stapes. A to-and-fro force is then applied, first in a direction that crosses the long axis of the foot plate, then obliquely toward the long axis of the foot plate, until full freedom of motion can be exerted in the long axis of the foot plate and in all directions of stapedia mobility.

Pure tone audiometric testing is employed in the operating room as a monitor of the successive degrees of improvement in hearing until maximum mobility of the stapes has been obtained. The circumstances that determine the degree of improvement are dependent on the firmness and extent of the otosclerotic process bind-

ing the stapes in the oval window. Should the entire foot plate be released from the otosclerotic process, excellent hearing improvement may result (Fig. 9, A and B). If only a segment of the foot plate is released, varying degrees of improvement may occur, depending upon the surface area disengaged.

Occasionally the crura are fractured, in which case leverage for continued efforts at mobilization by this technic is lost. There is great variation in the structure of the stapes among individual patients. In some the crura are exceedingly tenuous and the slightest pressure will cause a fracture. It has been shown that the most frequent site of fracture is at the juncture of the crura with the foot plate, where developmental osseous resorption is apt to be rather extensive. In the event of crural fracture, the foot plate still may be mobilized by the prying action of sharp picks^{7c} or be fractured or pulverized with a miniature hammering device or a vibrator type of pulverizer. The latter procedures have not been encouragingly successful.

The operation is terminated by replac-

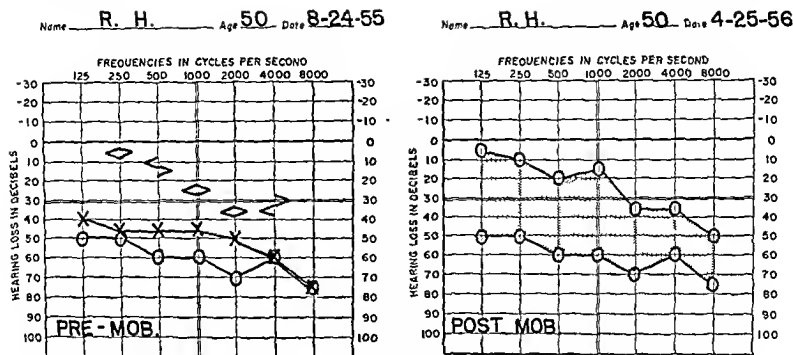


Fig. 9—A, mobilization of stapes of right ear, Aug. 25, 1955. B, most recent audiogram, showing magnitude of sustained improvement.

quence if ordinary technical caution is exercised. In the event of a perforation, a tissue paper diaphragm or a compressed gelatin pledget may be placed over the defect to seal the middle ear during the healing process.

It is possible that otitis media, with its varied complications, may result from mobilization of the stapes unless adequate antibiotic prophylaxis is prescribed. Despite this protective consideration, excessive surgical trauma may invite resistant infection, as it may after any surgical procedure.

On rare occasions the peritympanic incision may be the source of postoperative bleeding, but this is effectively controlled by firmly inserting a cotton pledget in the external auditory meatus to seal off the canal. Meddling with this annoyance is likely to result in contamination and an active infection.⁸

Results.—Four hundred stapes mobilizations were done in the eighteen months between October 1954 and April 1956. The results for the preoperative category one are shown in Table 1. The total number

of ears treated in this group was 210. Hearing improved to the level of 30 db. or more in 94 ears (44.7 per cent). Subsequent regressions, most of them occurring within four weeks after the operation, were noted in 14 ears, leaving a net successful result for 80 ears or 38.1 per cent. Hearing in 63 instances (30 per cent) improved 15 db. or more but did not reach the 30 db. level. Eventual regressions withdrew 16 initial improvements; thus, 47 (22.4 per cent) sustained an improvement of 15 db. or more for six to eighteen months. Hence, total improvement was obtained in 127 (60.5 per cent); total regression in 30 (14.3 per cent), and no improvement in 53 (25.2 per cent).

In preoperative category 2 there were 171 operations (Table 2). Sixty of these, or 35.1 per cent, improved hearing to the 30 db. thresholds or better, but subsequent regressions subtracted 11 within four months after the operation, so that at the time of writing there are 49, or 28.7 per cent, with hearing improvement sustained for six to eighteen months. In 53 (31.0 per cent) appreciable improvement was achieved but did not reach the 30 db. level

PLATE LX

- FIG 25 —Case 3 Polyp showing clubbed extremity with ulceration and loss of epithelial covering Masson's trichrome stain $\times 4$
- FIG 26 —Case 3 A group of cells with pale granular and vacuolated cytoplasm A spindle cell with an elongated process is seen in which longitudinal striation is well marked Celestin blue azo eosin $\times 300$
- FIG 27 —Case 3 A strap like cell with well marked longitudinal striation crosses the field obliquely Above it are granular cells, below it a spindle cell with forked extremity is seen Celestin blue azo eosin $\times 300$
- FIG 28 —Case 3 A spindle cell with a distinct pericellular sheath and faint longitudinal striation Mallory's acid fuchsin aniline blue orange G $\times 900$
- FIG 29 —Case 3 A group of "spider cells" in the cytoplasm of which there are rows of paired dots resembling primitive striation Note the nucleus of the large cell, with prominent nucleolus Mallory's phosphotungstic acid haematoxylin $\times 900$
- FIG 30 —Regenerating skeletal muscle fibres, 12 days after injury Syncytial masses with multiple nuclei, some central others peripheral, each with a prominent nucleolus The cytoplasm is vacuolated in places longitudinal striation is present, elsewhere the cytoplasm is homogeneous $\times 190$

TABLE 2.—*Bone Conduction Loss Less than 30 Decibels, Cochlear Reserve 25 Decibels or More (One Hundred and Seventy-One Cases)*

1.	Air conduction improved to 30 db. or more	N 60	35.1%		
	Subsequent regressions	11			
	Total			N 49	28.7%
2.	Air conduction improved 15 db. or more but not to 30 db. threshold	N 53	31.0%		
	Subsequent regressions	15			
	Total			N 38	22.2%
	Total improvements			N 87	50.9%
	Total regressions			N 26	15.2%
3.	No change			N 58	33.9%
	Total			N 171	100 %

TABLE 3.—*Bone Conduction Loss Above 30 Decibels, Cochlear Reserve 30 Decibels or More*

1.	Air conduction improved 15 db. or more	N 8	42.1%		
	Subsequent regressions	6			
	Total improvements			N 2	10.6%
	Total regressions			N 6	31.5%
2.	No change			N 11	57.9%
	Total			N 19	100 %

TABLE 4.—*All Preoperative Categories*

1.	Air conduction improved to 30 db. or more	N 154	38.5%		
	Subsequent regressions	25			
	Total			129	32.3%
2.	Air conduction improved 15 db. or more but not to 30 db. threshold	N 124	31.0%		
	Subsequent regressions	37			
	Total			87	21.7%
	Total improvements			216	54.0%
	Total regressions			62	15.5%
3.	No change			122	30.5%
	Total number of patients in study			400	100 %

It does not change the structure of the ear and involves a minimum of mental and physical inconvenience.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Die Ergebnisse von 400 Mobilisierungsoperationen des Steigbügels werden auf Grund der erzielten Verbesserung des Hörvermögens in drei postoperativen Kategorien nachgeprüft. Der Grad des Erfolges hängt offensichtlich vom Umfang der natürlichen Funktion ab, die durch die Schwellenwerte der Knochenleitung für die reine Tongehörmessung und durch eine kochleare Reserve, die einen Unterschied zwischen Luft- und Knochenleitung von mindestens 25 bis 30 Dezibels aufweist, ausgedrückt wird.

Bei 32 Prozent der 400 operierten Patienten war die Verbesserung des Hörvermögens bemerkenswert, bei 22 Prozent von gewissem Nutzen. In 62 Fällen (15,5 Prozent) liess die Hörkraft nach anfänglicher Besserung wieder nach. Viele von diesen wurden nachoperiert und konnten ihre Hörfähigkeit für wachsende Zeiträume erhalten. An einigen Kranken wurde eine Fensterungsoperation ausgeführt, andere zogen es vor, einen Hörapparat zu tragen. Die Erfolge in diesen Fällen bleiben in der vorliegenden Arbeit unberücksichtigt und werden in einer weiteren Untersuchung nachgeprüft werden.

In der Gruppe von 122 Versagern zeigten zehn Kranke einen weiteren Gehörverlust von 10 bis 15 Dezibels; sonst traten keine nachteiligen Erscheinungen auf, die die Fähigkeit des Kranken, den Hörapparat mit wenigstens der gleichen Wirksamkeit wie vor der Operation zu benützen, beeinträchtigt hätten.

Die Mobilisierung des Steigbügels stellt ein verhältnismässig unkompliziertes Verfahren zur Besserung des Hörvermögens bei einer bemerkenswerten Anzahl von Kranken dar, bei denen die Hörschädigung

mit der klinischen Diagnose einer Otosklerose in Einklang steht.

Die Methode führt zu keiner Veränderung des Baues des Ohres und lässt sich mit einem Mindestmass von seelischer und körperlicher Beanspruchung des Kranken ausführen.

RESUMEN Y CONCLUSIONES

Se analizan los resultados de 400 operaciones de movilización del estribo de acuerdo con el grado de mejoramiento en la audición obtenido en tres categorías postoperatorias. Es evidente que el grado de éxito depende de una buena función natural como lo indican los umbrales de conducción ósea para la audiometría de tonos puros y la reserva coclear representada por una diferencia de conducción ósteo aérea por lo menos de 25 a 30 decibeles.

Treinta y dos por ciento de los 400 pacientes operados mostraron mejoría marcada y 22 por ciento lograron alguna mejoría en la audición. Además, hubo 62 pacientes (15,5 por ciento) cuyo poder auditivo disminuyó después de una mejoría inicial. Muchos de esos casos han sido reoperados con mejoría satisfactoria y duradera en la audición. Algunos se han sometido a fenestración y otros han preferido usar aparato auditivo auxiliar. Los resultados se han omitido en este reporte y serán objeto de otro estudio.

En el grupo de 122 fracasos, 10 pacientes mostraron una disminución de 10 a 15 decibeles; por otra parte, no hubo efectos adversos que impidieran a los pacientes usar un aparato auditivo auxiliar por lo menos tan efectivamente como antes de la operación.

La movilización del estribo proporciona un método relativamente sencillo de mejorar la audición en un número apreciable de pacientes cuyo defecto conducía al diagnóstico clínico de otosclerosis.

stituirão assunto de novo trabalho.

No grupo de 122 insucessos, 10 tiveram uma perda adicional de 10 a 15 decibéis pelo que não houve inconveniente em que tornassem a usar aparelhos auxiliares da audição. A mobilização do estribo representa um método relativamente simples de melhorar a audição em apreciável número de doentes cujo diagnóstico era, clinicamente, de otosclerose.

Não há modificações estruturais da orelha e as repercussões físicas e mentais são insignificantes.

REFERENCES

1. Kessel, J.: Ueber die Durchschneidung des Steigbügel Muskels beim Menschen, etc., A.f.O. 11:199, 1876. Miot, C.: De la mobilization de l'etrier, Rev. Laryng. 10:49, 83, 113, 145 and 200, 1890.
2. Rosen, S.: Mobilization of the Stapes to Re-

store Hearing in Otosclerosis, New York State J. Med. 53:22, Nov. 15, 1953.

3. Kos, C. M.: Conservation of Hearing: Fenestration or Stapes Mobilization, J.A.M.A. 163 (March 9) 1957.

4. Siebenmann, F.: Traitement Chirurgical de la Sclerose Otique, Ann. de mal de l'oreille du larynx 26: pt. 2:467, 1900.

5. Rosen, S.: Palpation of Stapes for Fixation, Arch. Otolaryngol. 56:610-615, 1952.

6. Lempert, J.: Tympanosympathectomy: A Surgical Technic for the Relief of Tinnitus Aurium, Arch. Otolaryngol. 43:119, 1946.

7. (a) Rosen, S.: Mobilization of the Stapes for Otosclerotic Deafness: Preliminary Report on Two Years' Experience, Arch. Otolaryngol. 61: 197, 1955. (b) Scheer, A. A.: Restoration of Hearing in Otosclerosis by Transtympanic Mobilization of the Stapes, Arch. Otolaryngol. 61:513, 1955. (c) Rosen, S.: Restoration of Hearing in Otosclerosis by Mobilization of the Fixed Stapedial Foot Plate: An Analysis of Results, Laryngoscope 65: 224, 1955. (d) Kos, C. M.: Transtympanic Mobilization of Stapes for Impaired Hearing Due to Otosclerosis, Ann. Otol., Rhinol. & Laryngol. 64: 995, 1955.

8. Kos, C. M. (participant in symposium): The Operation for the Mobilization of the Stapes in Otosclerotic Deafness, Laryngoscope 68:747, 1956.

Whenever a textbook is written of real educational worth, you may be quite certain that some reviewer will say that it will be difficult to teach from it. Of course it will be difficult to teach from it. If it were easy, the book ought to be burned; for it cannot be educational. In education as elsewhere, the broad primrose path leads to a nasty place. This evil path is represented by a book or a set of lectures which will practically enable the student to learn by heart all the questions likely to be asked at the next external examination.

—Whitehead

PLATE LXII

MYOBLASTOMA OF THE SPERMATIC CORD

- FIG 35 —Case 5 A highly cellular area consisting of myoblasts with characteristic nuclei and strongly acidophile cytoplasm. Iron hematoxylin and van Gieson $\times 85$
- FIG 36 —Case 5 A hypertrophic myoblast with two large vesicular nuclei of characteristic type. Faint longitudinal striation can be seen in one end of the cell. Masson's trichrome stain $\times 390$

MALIGNANT MYOBLASTOMA OF TONGUE

- FIG 37 —Case 6 The tumour cells are chiefly spindle shaped, some being of great length. A very large vacuolated cell is seen on the left $\times 85$
- FIG 38 —Case 6 Several multinucleated myoblasts are shown and many of the smaller cells exhibit sinuous fibrillated extremities such as are seen in rhabdomyomata $\times 390$
- FIG 39 —Case 6 The cells are of elongated spindle shape, some mononuclear, others multinucleated. Their cytoplasm is extremely granular, but neither longitudinal nor cross striation is here in evidence $\times 390$
- FIG 40 —Case 6 The strongly acidophile cytoplasm of the spindle cells is apparent. In the upper part of the field several spindle cells show pronounced granularity, the cytoplasm being broken up into coarse acidophile dots. In the lower part of the field a large round cell with foamy granular cytoplasm is seen $\times 390$

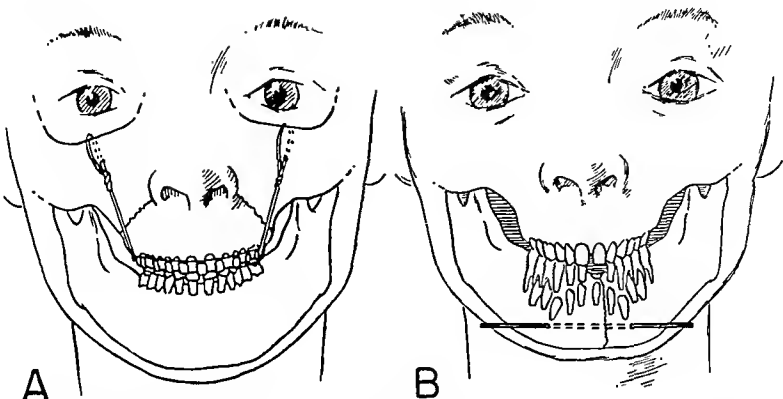


Fig. 1.—A, extra-oral use of orbital rims for stabilization of maxillary fractures. B, extra-oral pin fixation (Kirschner wire technic). This also can be used, care being taken to avoid permanent tooth follicles.

1. Any gross abnormalities in the general contour of the face should be investigated, with a minimum of handling.

2. Light palpation will disclose any sensitive area and any irregularities of the mandible, maxillae, zygomatic arches or zygomas.

3. A careful evaluation should be made of the occlusal status and of any displacement or mobility of the jaws.

4. The presence of submucosal hemorrhagic areas should be kept in mind, since this is usually indicative of underlying damage to the bone, particularly on the lingual aspect.

Roentgenograms.—The taking of roentgenograms, accurately positioned and properly exposed, is the most important of the diagnostic procedures in the young patient.

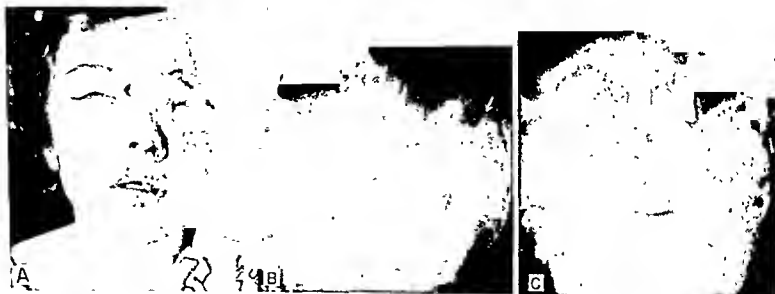


Fig. 2.—A, preoperative photograph of an 11-year-old girl with a severe left zygomatic fracture. B, preoperative Waters view of facial bones reveals posterior and lateral displacement of left zygoma. Also visualized are multiple fractures of nasal bones. C, postoperative Waters view revealing 32-gauge stainless steel wires immobilizing left zygoma in its normal anatomic relation. Wiring was also necessary for the nasal fractures.



tumours in his cases may have arisen from the striped muscle tissue which is present in the postero-superior portion of the prostate gland in the foetus and in the child. Such an explanation, however, could hardly apply to his fourth case, a young girl. It may be added that four of the twelve recorded cases occurred in females.

MYOBLASTOMA OF THE SPERMATIC CORD

Primary tumours of the spermatic cord are uncommon. The following case is therefore worthy of record both on account of the rarity of the condition and from the peculiar histological features of the new growth.

Case 5

Clinical history J R, male, æt 52, stated that he had injured himself in falling off a ladder three years previously. Some time thereafter a swelling appeared in the left side of the scrotum and later another swelling in the right side. The former was tense, fluctuant and translucent and was clearly a hydrocele, the latter was smaller, less tense and less translucent and the upper pole was not clearly defined. At operation bilateral hydroceles were found, the left being treated by radical operation. On the right side there was a small hydrocele and also a tumour in the substance of the spermatic cord. The growth, together with the right testis and cord and a large inguinal lymph gland, was removed. The patient made an uneventful recovery.

Pathological specimen The tumour is of ovoid shape and approximately 6×4.5 cm in diameter, it occupies the substance of the spermatic cord, the normal structures being pushed aside but firmly adherent to its outer surface. It appears to have arisen in the substance of the cord itself and is connected with the epididymis and testicle by an intervening area of unaffected cord. There is nothing to suggest that the growth is of testicular origin. The growth is firm and on section presents a white, silky, rather fibrous appearance resembling a fibromyoma.

Microscopically the structure is unusual, consisting largely of long strands of hyaline collagenous stroma between which lie spindle cells in fasciculi of various sizes. The growth is not highly vascular. In places the cellular elements predominate (fig 35), but elsewhere the stroma is more abundant and the cells are less numerous. The individual neoplastic elements are chiefly long spindle cells with strongly acidophilic cytoplasm which gives the usual staining reactions of muscle substance, being brown with van Gieson, red in Mallory's aniline blue method and tending to retain the stain in Heidenhain's iron hæmatoxylin method. These methods all show fine longitudinal striation in many of the cells, but no trace of transverse striation even with the most careful technique. In some of the cells the cytoplasm is vacuolated, in others it is markedly granular. Here and there among the tapering spindle cells there are elements with parallel sides and a few

maxilla can be further incorporated for immobilization of a complete fracture of the midportion of the face.

3. It may be difficult to secure anchorage for an arch bar or eyelet loop wiring in a child 7 years of age or younger, and an acrylic splint over the upper teeth may then be utilized to good advantage. The splints are made by taking colloid impressions of the upper and lower teeth and the associated related structures. This may necessitate anesthetizing the child for a short time. After this the acrylic splints can be made from the models poured from the original impressions. When the splint has been properly seated in the mouth, wires of stainless steel are inserted through the soft tissues overlying the maxillae, connecting the splint to a light plaster head cast.

4. Some inconvenience and difficulty may be encountered in maintaining a traction head cast on a child with maxillary

fractures. A procedure that eliminates the use of a head cast has been described by Adams, who suggested the drilling of small holes in the infraorbital rims. Through these, stainless steel wires are threaded and looped around each of the rims, after which they are attached to the maxillae in order to maintain them in their normal anatomic position.³ This works very satisfactorily when only the maxillae are fractured (Fig. 1 A).

Zygomatic Fractures: The majority of zygomatic and zygomatic arch fractures can be easily handled by either of two means. 1. The Gillies approach, utilizing a periosteal elevator which is inserted through an incision in the temporal area. The periosteal elevator follows the path of the temporal muscle under the zygomatic arch, and any malalignment or depressed fracture, if one exists in the zygomatic process of the temporal bone or the



Fig. 6.—A and B, 5-year-old boy with fracture of mandible in region of symphysis and right body. Immobilization was obtained by careful insertion of Kirschner wires as shown in B.

tongue in August 1928, it was not submitted for microscopic examination. About a year later, a small tumour growing from the under surface of the right posterior third of the tongue was excised. It had been present to the patient's knowledge for five weeks, and the cervical glands on the right side of the neck were enlarged. Two years after the onset, the patient returned complaining of pain in the throat and right ear. He was unable to protrude the tongue fully, but it was not deviated to either side. There had been a local recurrence of the growth, the right tonsil was congested and the mucosa on the anterior pillar showed superficial ulceration. During the ensuing six months, the pharynx and glands were treated by diathermy and radium applied by needles and collar, the total exposure being 14,620 mg hrs. The effect of the radium appeared to be restricted to diminution of pain, it had little effect on the local growth. The patient died some time later, but the exact cause of death was not ascertained, it was thought to be the result of local recurrence in the mouth and glands followed by sepsis, rather than of general dissemination.

Pathological examination The first recurrence was submitted for microscopic examination. The specimen was an ovoid tumour measuring $1.5 \times 1 \times 1.3$ cm attached to a small wedge of lingual tissue. The tumour was sessile and was attached to the tongue by a base less than 1 cm in diameter, and thereby a circular shallow cleft was formed between the margin of the tumour and the tongue. In this cleft there was considerable ulceration, but some portions of squamous epithelium still remained, on the surface of the tumour, however, the epithelium was represented only by a few fragments, the remainder of the surface being covered with rather necrotic granulation tissue.

Microscopically the tumour consists of elongated cells grouped in interlacing bundles, they are almost uniformly spindle shaped, but there are also scanty ribbon-like cells of uniform width throughout their length and some with one extremity tapering, while the other end broadens out like a partially opened fan. The nucleus, situated either in the centre of the cell or nearer the shorter extremity, is of long oval shape with blunt rounded ends, it stains moderately deeply and contains numerous chromatin nodes with occasionally a small vacuole (fig 39). Mitotic figures are very numerous but multinucleated cells are extremely rare. The cytoplasm is strongly acidophile, giving the usual tinctorial reactions of muscle tissue, in the broader cells a fine granularity of the cytoplasm is very distinct and the cytoplasm generally is highly refractile like that of striated muscle. The cells vary from 20 to 60 μ in length, and from 8 to 12 μ in width. There are no cells of exceptionally large size and the hypertrophic myoblasts seen in the simple myoblastomata are absent.

The tissue consists almost entirely of tumour cells between which lie a few dilated, thin-walled capillary blood vessels. The stroma is inconspicuous, but impregnation with silver reveals a delicate reticulum surrounding groups of cells and in places around

spine and the maxilla. This single wire will maintain the teeth in normal occlusion without necessitating additional support.

3. Displaced condylar fractures must be carefully evaluated as to their prognosis and the possibility of growth abnormalities due to any extensive condylar damage. Open reduction and wiring or external pinning is occasionally the treatment of choice when the condylar fragment interferes with normal mandibular motion.

CONCLUSIONS

Fractures of the facial bones in children are relatively infrequent. When they do occur, definitive treatment should be instituted promptly. Certain precautions and principles not usually adhered to with elderly patients should be observed.

1. An appliance or procedure should be kept as simple as possible, in order to restore proper occlusion and function.

2. There should be minimal interference with the deciduous and underlying permanent tooth follicles.

3. Elbow restraints may be necessary to prevent dislodgement of the previously applied oral appliances.

4. Precautions should be taken to allow proper feeding and administration of fluids, regardless of type of appliance used.

SCHLUSSFOLGERUNGEN

Knochenbrüche des Gesichtsschädels kommen bei Kindern verhältnismässig selten vor. Wenn sie auftreten, muss sofort eine energische Behandlung eingeleitet werden. Gewisse Grundsätze der Behandlung und Vorsichtsmassnahmen, die bei älteren Kranken im allgemeinen nicht beachtet werden, müssen innegehalten werden.

1. Die angewandten Verfahren und Apparate sollen möglichst einfach gehalten sein, um eine normale Schlussstellung

und Funktion wiederherzustellen.

2. Die Milchzähne und die darunter liegenden Zahnsäckchen der bleibenden Zähne sollen so wenig wie möglich angestastet werden.

3. Das Anlegen von immobilisierenden Ellbogenschienen mag notwendig sein, um das Losreissen angewandter Apparaturen im Munde zu verhüten.

4. Welche Art von Mundschienen immer bevorzugt sein mag, muss für die Möglichkeit ausreichender Nahrungs- und Flüssigkeitszufuhr gesorgt werden.

CONCLUSOES

As fraturas dos ossos nazais nas crianças são relativamente raras. Quando ocorrem, o tratamento definitivo deve ser feito imediatamente. Certas precauções e princípios não relacionados com esses acidentes nos adultos devem ser observados.

1. Os métodos de redução devem ser os mais simples possíveis porem devem manter a imobilização e restabelecer as funções.

2. Devem ter interferência mínima com os elementos dentarios já migrados e também com os folículos dentarios ainda retidos.

3. A imobilização do cotovelo poderá ser necessária para evitar que a criança perturbe a fixação das amarras interdentarias.

4. Devem ser tomadas as medidas adequadas para alimentação e administração de líquidos, seja qual for o tipo de imobilização usada.

CONCLUSION

Les fractures de la face chez l'enfant ne surviennent que relativement rarement. Quand elles se produisent, il faut instituer un traitement définitif le plus prompt possible. Certaines précautions et principes qui ne s'appliquent pas aux adultes doivent être observés.

tumours are usually situated in the dorsum near the tip, and rarely exceed the size of a hazel nut they are firm to the touch, of pale fleshy colour and well demarcated from the lingual musculature. Easily excised, they rarely recur and glandular involvement is not recorded. The microscopic structure is usually that of a pure myoblastoma and clinically they usually behave as simple tumours.

True rhabdomyomata are extremely rare, Pendl (1897) reported in a male infant of 8 weeks a true rhabdomyoma with cross striped fibres which occupied the left half of the tongue and prevented suckling. The growth was of firm elastic consistence and showed a nodular ulcerated surface. It was not encapsulated and attained the size of a pigeon's egg. The ultimate result of this case was not recorded.

Two unusual myogenic tumours of a different structure have been described in the tongue by Diss (1927) and Jaulin and Grandelaude (1929). Both occurred in patients who were the subjects of syphilitic leucoplakia or glossitis, and were pale, hard, non ulcerating tumours the size of a pea and growing from the dorsum of the tongue. The microscopical structure consisted of large clear cells with acidophilo granules in their cytoplasm and peripherally situated nuclei. Attention is drawn to the clear cytoplasm of these cells in paraffin sections owing to loss of their rich glycogen content, the resemblance to xanthoma being very striking. In the deeper parts of the tumours, the striped lingual musculature was becoming transformed into these tumour cells, but both authors regarded the tumours as true neoplasms and not as degenerations. Schirmer's case, a typical myoblastoma of the tongue, was associated with a true squamous epithelioma of the surface epithelium, and a similar case was recorded by Quirin (1925), not in the tongue but situated between the anterior pillar of the fauces and the salivary region. Simple hypertrophy of the squamous epithelium covering a myoblastoma is not unusual, but actual invasion by the epithelium to produce a combined tumour is noteworthy.

In the above case which we have classified as myoblastoma, the clinical behaviour is that of a malignant tumour, and the presence of very numerous mitotic figures supports this conclusion. We are unable in the literature to find any record of a similar case, all the malignant examples showing striation either in the primary or secondary growths. It is most unfortunate that there was no biopsy of the enlarged cervical glands and that post-mortem examination was omitted. In the absence of complete information we cannot be certain, but we are of the opinion that the tumour is a myoblastoma of malignant character, and is therefore a noteworthy addition to the literature of this group. The tumour cells are smaller and exhibit much greater uniformity than in the simple myoblastomata. They have reverted to a short spindle-cell type with granular cytoplasm reminiscent of an early stage in myogenesis prior to the development of fibrillation, and are of a size which easily renders possible their dissemination by the lymphatic system, as appears to have occurred.

no further "packing" is used. The patient is allowed to get up when he feels ready, usually on the second to the fourth post-operative day. If continuous bed rest has been ordered this does not apply. The ordinary postoperative measures are used; drawing the finger through the anus every day or two to prevent pocketing or bridging is worth mention.

To epitomize the foregoing comments: Surgical measures are still required in most cases of tuberculous fistula-in-ano. Of first importance is the activity and extent of the pulmonary disease, of which the fistula is merely a complication. The time of operation, except for incision of a perianal abscess, is determined by the activity of the pulmonary disease. In performing a fistulectomy, the standard procedures are used.

CRITERIA FOR DIAGNOSIS

Disagreement exists as to criteria for diagnosis. My experience indicates that the results of histopathologic examination supply the *only* criterion of importance.

It is well known and, in my opinion, a generally accepted fact that a clinical diagnosis founded only on the gross pathologic picture is absolutely undependable, even though the opinion is that of one thoroughly conversant with the lesion. *Not so well known and not so widely accepted* are the real value of histopathologic examination of suspected tissue and the limited reliability of guinea pig inoculation with preparations of tissue excised from the fistulous tract or the wall of the abscess cavity.

The advocates of guinea pig inoculation as the most valuable means of diagnosing tuberculosis in cases of perianal inflammatory and suppurative disease, particularly abscess and fistula, in most instances accept their observations at face value. The fact is there is a large element of error

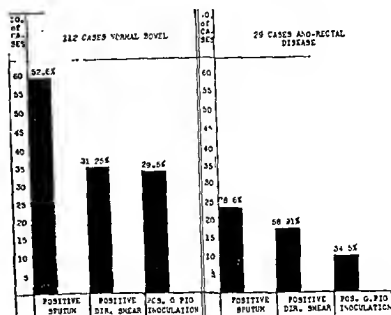


Fig. 2.—Charted observations in 141 of the 200 cases examined.

here that is either unknown or overlooked.

In a study of 200 patients with pulmonary tuberculosis, reported from this service (Fig. 2), it was determined that not only viable but virulent tubercle bacilli were present in the lower portion of the sigmoid and in the rectum in more than 30 per cent. Of patients with anorectal abscess or fistula, 34 per cent had such bacilli present in the last foot of the bowel within an hour after an enema.

In a third of the cases, therefore, tubercle bacilli may enter the rectal or anal orifice (the internal opening) of the fistulous tract. Accordingly, whether the fistula is a tuberculous process or not, tubercle bacilli may be present in it in a third of the cases. At the time the report was published, this large margin of possible error had not been considered in any article on the subject in the current literature. One reason for this is that so little work had been done to determine the incidence of viable tubercle bacilli in the terminal portion of the bowel.

It is absolutely impossible to wash or treat tissue excised or curetted from these fistulous tracts in any way known to bacteriologists, so that contamination of tis-

We feel that the significance of the naked-eye appearance of these tumours has not been sufficiently appreciated, and we consider that any tumour growing from a mucous surface which presents a lobulated polypoid structure with translucent clubbed processes should be fully investigated to determine whether it is a rhabdomyoma, recognition of this being vitally important in prognosis

Microscopic structure

Rhabdomyoma The essential criterion of a rhabdomyoma is the demonstration of both longitudinal and cross striations. Usually these are present in a considerable proportion of the cells, which are then likely to be of elongated, tubular or strap-like form with parallel sides—apparently fairly well differentiated muscle fibres. Owing to the plane of the section they may, however, appear as mere protoplasmic fragments in which the myofibrils are seen as darkly staining acidophile dots. Frankly striated elements are not difficult to detect but their identification may demand staining by special methods. Heidenham's iron hæmatoxylin is generally accepted as the most useful, and proved so in our experience. Mallory's phosphotungstic acid-hæmatoxylin is also of much value, and Millar's (1933) modification of the Kull technique proved helpful, but requires very careful differentiation to avoid complete decolourisation of imperfectly formed myofibrils. Mallory's aniline blue method, and the various trichromic methods of Masson yield exquisite pictures on suitably fixed material.

Cross striation is often best seen in the finer fibres and in doubtful cases careful search should be made in the elongated extremities of the spindle cells. The larger myoblasts usually show longitudinal fibrillation but cross striation is less frequent and is often confined to the outer layers of the cytoplasm.

The presence of spider cells has been described by various authors in congenital rhabdomyoma of the heart and in teratoma. These are large cells, the cytoplasm of which usually contains abundant glycogen in the form of globules, while the nuclei may show globular inclusions of unknown nature. Montpellier states that spider cells are confined to congenital cardiac tumours, but they have also been recorded elsewhere. Himwich (1920) described similar cells in a rhabdomyoma of the ovary, the tumour contained branching striated muscle which he interpreted as cardiac muscle of teratoid origin. Houette observed similar elements in a congenital bladder tumour where a relation to cardiac muscle seems improbable, and Martin and Alexander recorded their presence in a palatal rhabdomyoma. We agree with Montpellier that the presence of spider cells is in no way essential to the diagnosis of

3. The presence or absence of viable tubercle bacilli in the excised lesions as demonstrated by culture or animal inoculation. Here, however, positive results are subject to a 30 per cent error in cases of positive sputum.

4. Tuberculous granulation tissue observed on histopathologic study. This is the most important and the only pathognomonic test when the results are positive.

On a single section this is only positive in about 50 per cent of cases, but when run in serial section is at least 75 per cent efficient. Staining only every third section is usually all that is necessary, and even staining every tenth gives good results.

The absolute figures depend upon the number of the remaining 25 per cent that are nontuberculous. If the results of animal tests or cultures are positive and those of the sputum test are negative, the lesions may be added to those detected by histopathologic examination. If the specimen comes from a positive tuberculous patient the probability is that it is tuberculous, but in the absence of the aforementioned criteria it must be accepted as nontuberculous or held in doubt until proved otherwise by the proper methods.

Author's Note: Acknowledgment is made to M. L. Lichtenstein and Henry C. Sweany, associates at Municipal Tuberculosis Hospital, from whom I have quoted freely.

RESUMEN Y CONCLUSIONES

La opinión acerca de la naturaleza de las lesiones fistulosas de la región anal son dependientes de varios factores:

1. La historia clínica y la aparición de la lesión.

2. La historia clínica de tuberculosis activa o apagada, o evidencia de la misma por exámenes radiológicos o de laboratorio.

3. La presencia ó ausencia del bacilo tuberculoso viable en las lesiones extirpadas demostrado por cultivo ó por inoculación animal. Aquí, sin embargo, los re-

sultados positivos están sujetos a 30 por ciento de error en caso de esputo positivo.

4. Tejido de granulación tuberculoso observado en estudios histopatológicos. Este es el test mas importante y el único patognomínico cuando los resultados son positivos.

En un corte único solo es positivo en cerca del 50 por ciento de casos, pero cuando se hacen cortes seriados es por lo menos 75 por ciento eficiente. Generalmente es suficiente teñir uno de cada tres cortes y aún tiñendo uno de cada diez se logran buenos resultados.

Las cifras absolutas dependen del número de casos no tuberculosos incluidos en el 25 por ciento restante.

Si los animales ó los cultivos son positivos y el esputo es negativo, esos casos pueden sumarse a los encontrados por examen histopatológico.

Si los especímenes provienen de un paciente tuberculoso positivo la probabilidad es que sea tuberculoso, pero en ausencia del criterio mencionado las lesiones deben aceptarse como no tuberculosas ó mantenidas en duda hasta que se demuestre lo contrario con métodos apropiados.

RÉSUMÉ ET CONCLUSIONS

Une opinion décisive quant à la nature des lésions fistuleuses de la région anale sera influencée par divers facteurs:

1. Anamnèse clinique et aspect de la lésion.

2. Anamnèse clinique d'une tuberculose en activité ou latente, ou évidence radiologique ou bactériologique de tuberculose.

3. Présence ou absence de bacilles tuberculeux actifs dans la lésion excisée, démontrée par la culture in vivo ou in vitro. Là cependant des résultats positifs sont sujets à erreurs dans 30% des cas avec crachats tuberculeux.

4. Granulation tissulaire tuberculeuse observée lors de l'examen histopatholo-

We feel that the significance of the naked-eye appearance of these tumours has not been sufficiently appreciated, and we consider that any tumour growing from a mucous surface which presents a lobulated polypoid structure with translucent clubbed processes should be fully investigated to determine whether it is a rhabdomyoma, recognition of this being vitally important in prognosis

Microscopic structure

Rhabdomyoma The essential criterion of a rhabdomyoma is the demonstration of both longitudinal and cross striations. Usually these are present in a considerable proportion of the cells, which are then likely to be of elongated, tubular or strap-like form with parallel sides—apparently fairly well differentiated muscle fibres. Owing to the plane of the section they may, however, appear as mere protoplasmic fragments in which the myofibrils are seen as darkly staining acidophile dots. Frankly striated elements are not difficult to detect but their identification may demand staining by special methods. Heidenham's iron hæmatoxylin is generally accepted as the most useful, and proved so in our experience. Mallory's phosphotungstic acid-hæmatoxylin is also of much value, and Millar's (1933) modification of the Kull technique proved helpful, but requires very careful differentiation to avoid complete decolourisation of imperfectly formed myofibrils. Mallory's aniline blue method, and the various trichromatic methods of Masson yield exquisite pictures on suitably fixed material.

Cross striation is often best seen in the finer fibres and in doubtful cases careful search should be made in the elongated extremities of the spindle cells. The larger myoblasts usually show longitudinal fibrillation but cross striation is less frequent and is often confined to the outer layers of the cytoplasm.

The presence of spider cells has been described by various authors in congenital rhabdomyoma of the heart and in teratoma. These are large cells, the cytoplasm of which usually contains abundant glycogen in the form of globules, while the nuclei may show globular inclusions of unknown nature. Montpellier states that spider cells are confined to congenital cardiac tumours, but they have also been recorded elsewhere. Himwich (1920) described similar cells in a rhabdomyoma of the ovary, the tumour contained branching striated muscle which he interpreted as cardiac muscle of teratoid origin. Houette observed similar elements in a congenital bladder tumour where a relation to cardiac muscle seems improbable, and Martin and Alexander recorded their presence in a palatal rhabdomyoma. We agree with Montpellier that the presence of spider cells is in no way essential to the diagnosis of

nelle sezioni in serie è positivo nel 75%.

E' sufficiente colorare una sezione ogni tre o anche una ogni 10. Se l'animale o le colture sono positive e lo sputo è negativo questi casi devono essere uniti a quelli stabiliti con gli esami istopatologici. In assenza di questi criteri la lesione deve essere considerata come non tubercolare o

almeno lasciata in dubbio fino a che non venga provato il contrario.

REFERENCE

Martin, C. L., and Sweany, H. C.: Streptomycin in the Treatment of Tuberculosis of the Recto-sigmoid Region and Anus, Surg., Gynec. & Obst. 90:681-685 (June) 1950; Tuberculosis Anal Abscess, Fistula, Criteria for Diagnosis, *ibid.* 71: 294-296 (Sept.), 1940.

IMPORTANT NOTICE TO ALL PARTICIPANTS IN CONGRESSES AND REGIONAL MEETINGS

Those desiring their Congress presentations to appear later as articles in the Journal of the International College of Surgeons, please note:

1. A full copy of the manuscript, together with all illustrations, legends, tabular matter and bibliographic references, should be sent DIRECT to the Editorial Office, Journal of the International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois. Manuscripts so submitted will be promptly acknowledged and, on acceptance by the Editorial Board, published as soon after the Congress as possible. The Journal cannot be held responsible for loss, failure of acknowledgment, delay in publication or nonpublication of any manuscript, or any subsidiary material appertaining thereto, which has not been submitted through the official editorial channels.

2. Manuscripts may be submitted in advance of the Congress if desired, date of the Congress or Meeting concerned, to guard against premature publication.

3. Manuscripts delivered in person to Congress officials or others for press reportorial use only should be sent by the recipient to the Public Relations Bureau.

4. If illustrations are desired and it is impossible to submit them at the time the manuscript is submitted, the notation "Illustrations to come" should accompany the latter; otherwise the article may be scheduled for publication before the illustrations have arrived.

These requests are made not only to safeguard the Journal from error but in the best interests of our contributors. To make sure of prompt acknowledgment and efficient handling of your Congress presentation, please send it DIRECT to its ultimate destination!

The simple myoblastomata are on the whole slowly growing tumours and why they fail to develop well formed fibrils is not yet clear, it certainly cannot be attributed to excessively rapid growth. Malignancy appears to be much less common in myoblastomata than in rhabdomyomata, but the difference may be more apparent than real, owing to the difficulty in furnishing proof of muscle origin in suspected cases. The morphology and staining reactions of the cells and the refractile character of their cytoplasm are the criteria by which they may be recognised but doubtless many examples go unrecorded because of lack of unequivocal proof such as is afforded by the demonstration of cross striation in the true rhabdomyomata. The case of Muller appears to be an example of malignant myoblastoma of skeletal muscle and Ewing (1928) states that a few similar cases are on record. The case recorded above by us is the first described in the tongue.

Malignancy and metastases

In our studies of the literature on rhabdomyomata we have been impressed with the note of pessimism sounded by most writers as to the ultimate prognosis, and with this our own experience is in accord. In particular the tendency to local recurrence, in the first instance only after a lengthy period, should be emphasised, since all too frequently examples are recorded so soon after operative removal that freedom from recurrence cannot safely be assumed and doubt must therefore exist as to the end result. We have, however, to distinguish between local recurrence and actual dissemination to distant parts. Many rhabdomyomata are exceedingly prone to repeated recurrence in spite of extensive surgical excision and such widespread destruction of tissue may follow as to bring about a fatal issue. Certain sites appear to be particularly prone to this occurrence, and the so-called sarcoma botryoides of the vagina is notorious. Mönckeberg (1907), Miller and Gurd (1910), McFarland (1911) and Dugge (1930) all report cases fatal by reason of local extension, and an unusual example is that of Edwards and Richardson (1934), where a lesion of the hymen, treated as inflammatory for six months, revealed its malignant nature by invasion of the pelvis.

Rhabdomyoma sarcomatodes differs from other sarcomata in its tendency to dissemination by the lymphatic pathway. Willis (1934) states that regional lymph-node metastases are the risk, the growths thus behaving like carcinomata, successive groups of lymph nodes may then be involved until ultimately almost all the nodes throughout the body are replaced by new growth (Hirsch, 1929). In the later stages, widespread blood-borne dissemination occurs, but this may be merely a terminal event that it should



Fig. 3 (Case 1).—A, severe constrictive stricture of esophagus due to ingestion of poisons. B, postoperative roentgenogram showing esophagus after transposition of colon.

Dermatome anastomosis was done to restore the continuity of the intestinal tract. Dermotome skin dissecting of the anterior portion of the medianum from the xiphoid to the neck was performed, and an incision was made on the anterior border of the left sternomastoid. The proximal end of the isolated loop of the colon was brought up to the neck, where an Dermatomy was performed. The distal end of the loop of colon was implanted end to side in the stomach. The abdomen was closed.

From the fourth postoperative day the patient was fed by means of a catheter introduced into the stomach from the cervical Dermatomy. On the twentieth day the cervical portion of the esophagus was transected above the constricted portion, and an end-to-side anastomosis to the ileum was performed. The distal end of the esophagus was partially resected and drained by means of a tube. Feeding was continued through the Dermatomy for ten more days, after which the catheter was withdrawn and the Dermatomy closed.

Roentgen examination demonstrated a satisfactory functional swallowing mechanism in the transplanted colon (Fig. 1B). Twenty days after the second intervention the patient was discharged with a gain in weight of 8 kg.

Case 2.—A woman aged 15 stated that three months earlier she had drunk sulphuric acid by mistake. Chemical strands of the esoph-

agus followed and was treated by bougienage, without result. The patient could swallow liquids in small quantities. On admission she had lost 12 kg. in weight. Roentgenograms showed an extensive stricture of the thoracic portion of the esophagus, beginning at the height of the sternoclavicular joint (Fig. 2A).

The first operation was performed on Sept. 20, 1935. The same procedure was applied as in Case 1, with the difference that the right colic artery was in this case well developed and could be used as the vascular pedicle of the mobilized right half of the colon. Dermotome transposition of the loop was performed, with left cervical Dermatomy and implantation into the stomach of the lower end of the colon. Intestinal continuity was reestablished by Dermatome anastomosis. Food was given by means of a rubber tube introduced into the stomach from the Dermatomy. At a second stage, twenty days later, side-to-end anastomosis of the ileum to the transected esophagus was done. The Dermatomy was closed a month after the first intervention.

Roentgenograms demonstrated good function of the transplanted colon (Fig. 2B). The patient was discharged forty days after the first operation, having gained 8 kg. in weight.

Case 3.—A woman aged 15 stated that six months prior to admission she had swallowed poisons, which produced a severe constrictive stricture of the esophagus. Conservative treatment was considered unpromising. Only small



Fig. 4 (Case 3).—A, total obstruction of thoracic portion of esophagus beneath fifth dorsal level. B, postoperative roentgenogram showing satisfactory swallowing mechanism.

Reported cases of metastasising rhabdomyoma

No	Author	Age	Sex	Primary tumour		Metastases		Route of spread
				Site	Microscopic appearances	Site	Microscopic appearances	
1	Kunert (1874)	35	F	Uterus	Spindle cells, large round cells, cross striated muscle	Spread to pelvis, involvement of left iliac vein, pleura	Similar to primary tumour	(1) Lymphatics (2) Blood
2	Wolfenbarger (1894)	75	M	Oesophagus	Spindle cells, large myoblasts, cross striation observed	Lymph nodes at carinae and of oesophagus	Spindle cells, cross striation seen with difficulty	Lymphatics
3	Stoerk (1901)	25	M	Left vas deferens, invading testis	Spindle cells, long but not cross striation	Left inguinal retro-peritoneal lymph nodes, cervical lymph nodes, two nodules in lung	Spindle cells with cross striation, band forms, giant cells	(1) Lymphatics (2) Blood
4	Kaufmann (1902)	29	M	Prostate	Spindle and round cells, cross striation	Liver, lungs, pleura, stomach, duod., bone	Protoplasmic masses, striations not mentioned	Blood
5	Benenath (1903)	40	M	Left undescended testis near kidney	Long and cross striated muscle cells, round and giant cells	Mesenteric retro peritoneal lymph nodes, normally draining testis	Round cells, no muscle cells	Lymphatics
6	Mönckeberg (1907)	10	M	Vas deferens, tunica vaginalis and testis	Short and long spindle cells, band forms, invading lymphatics	Mass in lower abdomen, P.M.		Lymphatics
7	Burgess (1913-14)	19	F	Undetermined		Subcutaneous tissue, many sinuses, bone marrow and periosteum of ribs and skull, lymph nodes, striated muscle, lungs, pancreas	Polymorphous undifferentiated cells, spindle cells, cross striations, eosinophilic, striated, Blood leukaemia	(1) Lymphatics (2) Blood
8	Squier (1910)	40	M	Prostate	Glandular hyperplasia, dense fibrous tissue, striated muscle cells, spindle-cell sarcoma	Recurrence in scar, general dissemination	No notes	Blood
9	Ritter (1918)	34	M	Left lumbar muscles	Round spindle and giant cells, cross striation marked	Lungs, pleura, pericardium, inguinal, mediastinal and mesenteric lymph nodes	Similar to primary tumour, all stages up to mature cells	(1) Lymphatics (2) Blood
10	Smith and Torgerson (1926)	31	M	Prostate	Spindle-cell sarcoma, fibrous, cross striation	Pelvis (by continuity), regional lymph nodes, body of fourth lumbar vertebra, tenth rib	Very anaplastic and tumorous, ringlike	(1) Lymphatics (2) Blood

SUMMARY AND CONCLUSIONS

Five cases are reported of extensive cicatricial stenosis of the esophagus, treated during the past two years by retrosternal transposition of an isolated colonic loop. In 4 cases the right half of the colon and the terminal portion of the ileum were transplanted; in 1 case, the transverse portion of the colon, together with the splenic flexure. Reestablishment of the continuity of the intestinal tract was effected in 4 cases by an ileotransverse anastomosis and in 1 case by a colocolonic anastomosis of the ascending with the sigmoid portion of the colon. One end of the isolated loop of colon was implanted into the stomach (in 4 cases in conformity with peristalsis and in 1 case contrary to it). The other end was brought up to the left cervical region, where in 4 instances an ileostomy was performed and in 1 a colostomy of the descending portion of the colon. Ileostomy or colostomy was used to feed the patient, a rubber tube being introduced into the stomach during the stages of reconstruction. At a second stage an end-to-side anastomosis of the transected cervical portion of the esophagus with the ileum or the colon was carried out, and at a third stage the ileostomy was closed. All patients were discharged with satisfactory functional results and with notable gains in weight. Retrosternal transposition through the anterior portion of the mediastinum presents many advantages, such as the absence of pleural complications and the fact that it requires a lesser length of mobilized colon than does subcutaneous transposition. Replacement of the esophagus by the right half of the colon is regarded as the method of choice, because of the isoperistaltic transposition. Anomalies of the right colic artery may eventually preclude utilization of the right half of the colon, however, in which case the trans-

verse or the left portion should be transplanted in preference to the small intestine.

RIASSUNTO E CONCLUSIONI

Vengono riferiti 5 casi di estese stenosi cicatriziali dello esofago trattate, negli ultimi due anni, con la trasposizione retrosternale di un'ansa isolata del colon. In 4 casi furono trapiantati la metà destra del colon e la porzione terminale dell'ileo; in 1 caso fu trapiantato, invece, il colon trasverso con la flessura splenica. La continuità del tratto intestinale fu ristabilita in 4 casi con un'anastomosi ileotrasversa e in un caso con un'anastomosi colocolica dell'ascendente con la porzione sigmoidea del colon. Una estremità dell'ansa isolata venne impiantata, in 4 casi, nello stomaco in senso isoperistaltico ed in 1 caso in senso contrario. L'altra estremità fu inserita alla regione cervicale dove, in 4 casi un ileostomia o colostomia servì ad alimentare il paziente, dopo che durante la fase ricostruttiva, gli era stato introdotto un tubo di gomma nello stomaco. In un secondo momento si praticò un'anastomosi terminolaterale della porzione cervicale dell'esofago con l'ileo o il colon; e in un terzo stadio si chiuse l'ileostomia. Tutti i pazienti vennero dimessi con ottimi risultati dal punto di vista funzionale e tutti notevolmente aumentati di peso.

La trasposizione retrosternale attraverso il mediastino anteriore presenta molti vantaggi quali l'assenza di complicazioni pleuriche e un tratto di colon mobilizzato minore di quello richiesto nella trasposizione sottocutanea. La sostituzione dell'esofago con il colon destro è il metodo d'elezione data la trasposizione isoperistaltica. Può verificarsi che un'anomalia dell'arteria colica destra precluda l'utilizzazione del colon destro, ed in tal caso si preferisce l'utilizzazione del colon sinistro o trasverso.

short spindle cells in the primary growth. In the true rhabdomyomata such cells occur in clusters here and there, though they may be inconspicuous in the primary tumour and even in the early recurrences. The simple myoblastomata, on the other hand, are more homogeneous and uniform in cellular structure, and groups of highly anaplastic cells appear to be absent. We are convinced that therein lies the explanation of the difference in clinical behaviour of these two groups. Such an explanation is not purely theoretical, but is based upon a close study of the cases recorded above, and also from such information as has been obtainable in the literature.

SUMMARY AND CONCLUSIONS

In the foregoing paper the classification of striated muscle tumours is discussed and two groups each comprising simple and malignant types are proposed, namely, rhabdomyoma and myoblastoma. Rhabdomyomata are defined as tumours in which a proportion of cells show unequivocal longitudinal and transverse striation. Myoblastomata are defined as tumours whose cells morphologically and functionally resemble muscle cells but which are devoid of transverse striation.

Six neoplasms believed to have an origin in striated muscle are described, two rhabdomyomata and four myoblastomata. Two neoplasms occurring in the soft palate were typical malignant rhabdomyomata. They pursued a similar clinical course, characterised by repeated local recurrences over some years and terminating with widespread dissemination by lymphatics and blood stream. The remaining four examples are myoblastomata, two occurring in the urinary bladder and one in the spermatic cord appear to have been non-malignant, but one situated in the tongue presented malignant characters and proved fatal.

Striated muscle tumours growing from a mucous surface tend to show a coarsely polypoid structure with broad eubbed processes, and this appearance is sufficiently characteristic to be of value in clinical diagnosis. Striated muscle tumours are locally destructive but may also metastasise, usually first by the lymphatic pathway but later also by the blood stream. The number of recorded metastasising rhabdomyomata is surprisingly small. Those found in the literature have been tabulated in chronological order.

The expenses of this investigation have been defrayed by a grant from the trustees of the late Mrs Helen Small Johnston, to whom we are also indebted for the cost of the coloured plate.

colon droit est considérée comme la méthode de choix, en raison de la transposition iso-péristaltique. Les anomalies de l'artère colique droite peuvent éventuellement empêcher l'utilisation du colon droit; dans ce cas le transverse ou le colon gauche peuvent être transplantés, de préférence à l'intestin grêle.

RESUMEN Y CONCLUSIONES

Se reportan cinco casos de estenosis cicatricial extensa del esófago tratada por transposición retro-esternal de un asa aislada de colon, durante los últimos dos años. En 4 casos la mitad derecha del colon y la porción terminal del ileon fueron trasplantadas; en un caso el colon transverso con el ángulo esplénico. El restablecimiento de la continuidad del tracto intestinal se efectuó en 4 casos por una anastomosis ileo transversa y en 1 caso por una anastomosis colo-cólica, de la porción ascendente del colon al sigmoide. Un extremo del asa aislada de colon se implantó en el estómago en 4 casos, en forma isoperistáltica, y en un caso en forma anti-peristáltica. El otro extremo se llevó a la región cervical, en 4 casos se alimentó al paciente, a través de una ileostomía ó colostomía, introduciéndose un tubo de hule en el estómago durante los tiempos de la reconstrucción. En un segundo tiempo una anastomosis término-lateral de la porción cervical seccionada del esófago con el ileon ó con el colon se llevó a cabo y en un tercer tiempo se cerró la ileostomía. Todos los pacientes fueron dados de alta con resul-

tados funcionales satisfactorios y con notable aumento de peso.

La transposición retroesternal a través del mediastino anterior presenta muchas ventajas tales como la ausencia de complicaciones pleurales y por el hecho de que requieren menor longitud de colon movilizado que la transposición subcutánea. El reemplazo del esófago por el colon derecho se considera el método de elección para la transposición isoperistáltica. Las anomalías de la arteria cólica derecha pueden eventualmente impedir el uso del colon derecho en cuyo caso el colon transverso, ó el colon izquierdo pueden trasplantarse, siendo estos preferibles que el intestino delgado.

BIBLIOGRAPHY

- Freelich and Dantlo: Mem. Acad. de chir. 77: 185, 1951.
 Godard, H.: Presse med. 59:314, 1951.
 Goligher, J. C. S., and Robin, R.: Brit. J. Surg. 17:1373, 1954.
 Judine, S.: Surg., Gynec. & Obst. 78:561, 1944.
 Kourias, P.: Acta chir. Helliniki 3:93, 1955.
 Lafargue, P., and Dufour, R.: Mem. acad. de chir. 77:362, 1951.
 Lafargue, P.: Mem. acad. de chir. 77:420, 1951.
 Lortat-Jacob, E.: Presse med. 82:1259, 1949; Mem. Acad. de chir. 77:586, 1951.
 Makkas, M.: Acta chir. Helliniki A:5, 1954; Helliniki Iatriki 1:6, 1937.
 Orsoni, P., and Toupet, A.: Presse med. 58:804, 1950.
 Orsoni, P., and Lemaire, A.: J. de chir. 7:491, 1951.
 Reeve, Betts, Thomas, and Copinath: Surgery 38:553, 1955.
 Shumacker, H. B. Jr., and Battersby, J. S.: Ann. Surg. 133:463, 1951.
 Toupet, A.: J. de chir. 66:37, 1950.
 Rapant, V., and Hromada, J.: J. Thoracic Surg. 20:454, 1950.
 Von Hocker, K.: Arch. f. klin. Chir. 53:973, 1926.
 Wulliet, M.: Semaine med. 31:529, 1911.

The noise of the mill is heard by many; the flour is seen by few.

- SAILER, S *Arch Path*, 1936, *xli* 257
 SCHIRMER, R *Beit path Anat*, 1932, *lxxviii* 613
 SHATTOCK, S G *Proc Roy Soc Med*, 1909 *10*, *iii* Sect
 Path, 31
- SMITH, R R, AND TORGERSOHN, W R *Surg Gyn and Obst*, 1926, *xliii* 328
- SÖDERBERG, F *Acta Oto Laryngol*, 1932 *33*, *xviii* 453
 (Abstract in *Amer J Cancer*, 1934,
xx 186)
- SQUIER, J B *Surg Gyn and Obst*, 1916, *xliii* 341
 SSINELŠČIKOVA, K I *Cbl allg Pathol*, 1929, *xlvi* 100
 STOERK, O *Z Heilk*, 1901, *xlii* 200
 STUMPF, R *Beit path Anat*, 1911, *i* 170
 URTUBEY AND SIORRE *Arch espan d oncol*, 1933, *iii* 235
 (Abstract in *Amer J Cancer*, 1935,
xxv 477)
- WILLIS, R A *The spread of tumours in the human
 body*, London, 1934
- WINSBURY-WHITE, H P *Proc Roy Soc Med*, 1928 *29*, *xxii* 1382
 WOLBACH, S B *J Med Res*, 1907, *xvi* 495
 " " *Arch Path*, 1928, *x* 775
 WOLFENBERGER, R *Beit path Anat*, 1894, *xv* 491

colon droit est considérée comme la méthode de choix, en raison de la transposition iso-péristaltique. Les anomalies de l'artère colique droite peuvent éventuellement empêcher l'utilisation du colon droit; dans ce cas le transverse ou le colon gauche peuvent être transplantés, de préférence à l'intestin grêle.

RESUMEN Y CONCLUSIONES

Se reportan cinco casos de estenosis cicatricial extensa del esófago tratada por transposición retro-esternal de un asa aislada de colon, durante los últimos dos años. En 4 casos la mitad derecha del colon y la porción terminal del íleon fueron trasplantadas; en un caso el colon transverso con el ángulo esplénico. El restablecimiento de la continuidad del tracto intestinal se efectuó en 4 casos por una anastomosis íleo transversa y en 1 caso por una anastomosis colo-cólica, de la porción ascendente del colon al sigmoide. Un extremo del asa aislada de colon se implantó en el estómago en 4 casos, en forma isoperistáltica, y en un caso en forma anti-peristáltica. El otro extremo se llevó a la región cervical, en 4 casos se alimentó al paciente, a través de una ileostomía ó colostomía, introduciéndose un tubo de hule en el estómago durante los tiempos de la reconstrucción. En un segundo tiempo una anastomosis término-lateral de la porción cervical seccionada del esófago con el íleon ó con el colon se llevó a cabo y en un tercer tiempo se cerró la ileostomía. Todos los pacientes fueron dados de alta con resul-

tados funcionales satisfactorios y con notable aumento de peso.

La transposición retroesternal a través del mediastino anterior presenta muchas ventajas tales como la ausencia de complicaciones pleurales y por el hecho de que requieren menor longitud de colon movilizado que la transposición subcutánea. El reemplazo del esófago por el colon derecho se considera el método de elección para la transposición isoperistáltica. Las anomalías de la arteria cólica derecha pueden eventualmente impedir el uso del colon derecho en cuyo caso el colon transverso, ó el colon izquierdo pueden trasplantarse, siendo estos preferibles que el intestino delgado.

BIBLIOGRAPHY

- Froelich and Dantlo: *Mem. Acad. de chir.* 77: 185, 1951.
 Godard, H.: *Presse med.* 59:314, 1951.
 Goligher, J. C. S., and Robin, R.: *Brit. J. Surg.* 17:1273, 1954.
 Judine, S.: *Surg., Gynec. & Obst.* 78:561, 1944.
 Kourias, P.: *Acta chir. Helliniki* 3:93, 1955.
 Lafargue, P., and Dufour, R.: *Mem. acad. de chir.* 77:362, 1951.
 Lafargue, P.: *Mem. acad. de chir.* 77:420, 1951.
 Lortat-Jacob, E.: *Presse med.* 82:1259, 1949;
Mem. Acad. de chir. 77:586, 1951.
 Makkas, M.: *Acta chir. Helliniki* A:5, 1954;
Helliniki Iatriki 1:6, 1937.
 Orsoni, P., and Toupet, A.: *Presse med.* 58:804, 1950.
 Orsoni, P., and Lemaire, A.: *J. de chir.* 7:491, 1951.
 Reeve, Betts, Thomas, and Copinath: *Surgery* 38:553, 1955.
 Shumacker, H. B. Jr., and Battersby, J. S.: *Ann. Surg.* 133:463, 1951.
 Toupet, A.: *J. de chir.* 66:37, 1950.
 Rapant, V., and Hromada, J.: *J. Thoracic Surg.* 20:454, 1950.
 Von Hocker, K.: *Arch. f. klin. Chir.* 53:973, 1926.
 Wulliet, M.: *Semaine med.* 31:529, 1911.

The noise of the mill is heard by many; the flour is seen by few.

The wet weight of the lung was 1350 g. The mineral matter was extracted by the method introduced by Jones (1933) of sliming the lung in fuming nitric acid, burning off organic matter, and removing carbon by heating in a muffle furnace. The lung yielded 13.5 g. of mineral dust which had the following chemical composition * — SiO_2 67.22, TiO_2 1.00, Al_2O_3 17.00, Fe_2O_3 2.92, FeO 0.08, MgO 1.08, CaO 0.52, Na_2O 1.23, K_2O 5.20, P_2O_5 2.18, $\text{H}_2\text{O} + 110^\circ \text{C}$ 0.34, $\text{H}_2\text{O} - 110^\circ \text{C}$ 0.28.

Preparation of suspension and method of injection. Two g. of the dry dust (Res. no. VII) were rubbed up in a mortar with a little normal saline until a smooth paste was formed. To this more normal saline was added to make the total volume 100 c.c. The suspension was sterilised by steam in an autoclave at 120°C for 20 minutes, and was then stored for convenience in 5 c.c. ampoules.

Two c.c. of the suspension were injected into a marginal ear vein of each of four rabbits, R I, R II, R III and R IV. The dose was repeated every seventh day for 12 weeks, so that each animal received 13 doses and a total weight of 520 mg. of the dust.

In table I is shown the percentage distribution in terms of size of the particles in the suspensions of mineral dust used in all three

TABLE I
Percentage distribution of dust in terms of particle diameter

Source of dust	Percentage distribution of dust in terms of particle diameter				
	0.4 μ or less	0.8 μ	1.0 μ	2.4 μ	3.2 μ
Mineral residue from lung (Res. no. VII) Series I	74.5	20.7	2.0	1.5	0.7
Air borne mine dust, coarser fraction Cr. M. 1 Series II	76.1	19.8	3.2	0.7	
Air borne mine dust, finer fraction Cr. M. 2 Series III	80.7	17.7	1.5		

series of experiments. It will be noted that in series I, 95.2 per cent of the particles were of sizes of the order of 0.8 μ or less. The count in this type of dust can only be approximately correct, because with this particular method of extraction it is difficult to prepare films which do not contain many aggregates of particles. One may state with certainty, however, that in this mineral residue there were very few particles which measured more than 3 μ in diameter.

Results

The amount of dust injected, the cause of death and the number of days each animal lived after receiving the first injection are shown in table II.

* Through the courtesy of Dr W. R. Jones this chemical analysis was made by Dr A. W. Groves of the Chemistry Department of the Imperial College of Science, London.

It must be realized that in the early days of medicine there were two types of healer: the priest, whose ministrations called upon divine intervention, and the medical craftsman, whose interest was restricted to visible lesions, without concern for the causes of disease and the inner workings of the body. All questions related to hidden causes and hidden structures were considered philosophic rather than medical, and for centuries the medical man never arrogated unto himself the status of philosopher. It was only in the third century B.C. and for less than five hundred years that the transformation from craftsman to philosopher took place, but with the end of antiquity the physician, and particularly the surgeon, shed this uncomfortable garb of the philosopher and reverted to craftsmanship, while the

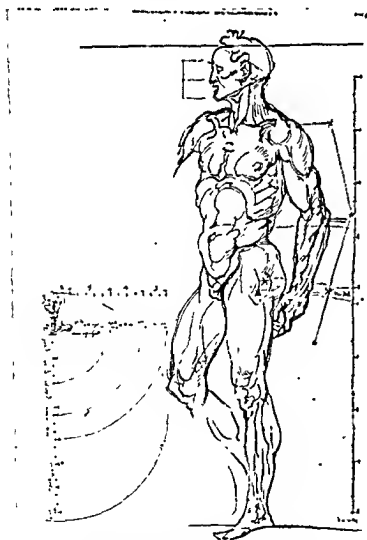
priests resumed their function as supernatural healers.

Curiously enough, the invasion of medicine by philosophy came by way of human anatomy, which, after the first century of our era, was condemned as the least philosophic and therefore the most neglected of all medical disciplines.

Until the time of Hellenistic, or Alexandrian, medicine, the study of human anatomy had not entered the realm of the Greek physician. The sculptures of Praxiteles reveal that the ancient Greeks were observant of the surface anatomy of the human body, but the study of internal anatomy had been left to chance observations, such as were offered by the occasional sight of a severely wounded gladiator, and was not pursued as a course of medical training. According to the views of the Hippocratic physician, further knowledge of the structure of the human body was not necessary, since it could be inferred from the study of animals.

The philosophers of the period went even further than the physicians in their analogic statements and arrived at conclusions that show a striking similarity to those of the early Chinese thinkers. Everything in the universe, they reasoned, was of the same composition as the universe itself; hence conclusions about the nature of the universe could be applied to all its creatures, and thus also to man. Aristotle challenged the principle of analogic deductions, stating that metaphors, while useful in poetry, were unsatisfactory as scientific theories.

Important as was the refusal of Aristotle and Theophrastus to make inferences from the structure of the animals and apply them to that of man, it was not by itself sufficient to help the Greeks overcome their inherent distaste for dissection of the cadaver, for until the fourth century B.C. the Greeks shared the belief of many ancient peoples that the human



Male figure after pen-and-ink sketch by Michelangelo, 1474-1564.

used for these two series of experiments. In the crude state this dust on microscopic examination was found to consist of particles the size distribution of which covered a very wide range. Many particles large enough, if introduced intravenously, to cause serious embolism were present. These were removed by the following methods of separation.

In series II a quantity of the entire dust (about 500 g) was wetted as thoroughly as possible and suspended in distilled water in tall glass beakers of 5 litre capacity. Settlement was allowed to take place over 24 hours, and at the end of this period the upper half of the fluid containing the finer

TABLE III

Results of intravenous injection of animals with suspensions of mine dust

Rabbit no	Estimated dry weight in mg of total dust injected	Cause of death	Days of survival after first injection
Series II Suspension Cr M 1			
* R VI	280	Killed	371
R VII	280	Lesions caused by dust toxic necrosis	103
* R VIII	280	Killed	371
R IX	280	Pneumonia and acute pericarditis	56
Series III Suspension Cr M 2			
* R X	230	Killed	276
R XI	230	Pneumonia and pleurisy	109
* R XII	96	Cirrhosis of the liver	246
R XIII	230	Embolism following dust injection	28
* R XIV	180	Killed	269

The animals marked with an asterisk showed at autopsy advanced cirrhosis of the liver

particles was decanted off and transferred to fresh glass beakers, where it was allowed to remain undisturbed until complete settlement of this fraction of the dust had taken place. The period for complete settlement occupied about 14 days. The supernatant clear fluid was decanted off and the remaining sludge evaporated to dryness. Two g of the dust, Cr M 1, thus collected were, without further treatment, resuspended in 100 c.c. of normal saline. This suspension, sterilised in the autoclave and finally stored in 5 c.c. ampoules, was used for the injection experiments included in series II, and these proved ultimately to be quite successful. Since it was the writer's aim to produce a suspension containing the finest dust free as far as possible from aggregates and from larger individual particles, drying the dust was eliminated. This was also simpler and more expeditious. After sedimenting the entire dust for 24 hours as before, the upper half of the fluid containing the fine particles was decanted off and passed through a Sharples' centrifuge

of his works that did survive contained least of the essence of his searching mind. They were dogmatic rather than scientific and thus appealed to the dogmatic minds of the medieval scholastics. To doubt Galen was tantamount to heresy and to be avoided by all means.

It took a complete change of intellectual atmosphere like that brought about by the Renaissance to cut through the thick veil of adoration that surrounded the traditional authorities.

Of the cultural factors that brought about the Renaissance the most important, perhaps, was the recovery of the original texts of the classics. Medievalism had abundant versions of classical texts, but the authors were obscured rather than clarified by too many translators, commentators and glossaries. Another factor contributing to the rebirth of thought was the expansion of Europe, the widened horizons that were the results of the Columbian voyages and, more specifically for medicine, the importation of new and important drugs. Finally, it was the invention of printing in 1450 that made the cultural achievements of the Renaissance possible. The Renaissance, thought of as a rebirth of the thought of antiquity, was destined to go beyond the Greeks and to lay the foundation of modern thought and method, especially in medicine and the related sciences. New thought, however, could not easily be substituted for old beliefs, and fierce struggles occurred between those who strove for advance and those whose security lay in the *status quo*. The spirit of the Renaissance was expressed by Niccolo Leoniceo, one of the earliest botanists, who said, "Why has nature given us our eyes and other senses unless we may rely upon ourselves in the search of what is true?" This dictum could easily have applied to the Renaissance anatomists and surgeons, for they were among the first to deviate from tra-



Anatomic sketch of two skeletons and two muscle-men, after Rosso de Rossi, 1496-1541.

dition and to use their eyes and their senses to discover what was true.

It is significant that the beginning of the study of human anatomy was made by one who was then and is now best known for his superb and unrivaled artistry. Leonardo da Vinci was a true humanist and a Renaissance personality in the most poignant sense of the term. His education combined philosophy with all other cultural subjects and medicine and the study of sciences with art. In his paintings his attention was often directed to the human body, and he felt that he could not do justice to the human body unless he understood it functionally and structurally. It was his plan, therefore, to write a textbook of anatomy; but, while many of his anatomic drawings have been preserved, they were less well known to his contemporaries than to us and of no influence on the anatomic thinking of his day. His textbook of anatomy was never published.

The real father of modern anatomy was Andreas Vesalius, who lived from 1514 to 1564. He was a Belgian from Wesel, from which he derived his name, and studied medicine at Louvain in Belgium and afterward in Paris. In both places he found the instruction utterly conservative and entirely based on Galen's anatomic texts.

used for these two series of experiments. In the crude state this dust on microscopic examination was found to consist of particles the size distribution of which covered a very wide range. Many particles large enough, if introduced intravenously, to cause serious embolism were present. These were removed by the following methods of separation.

In series II a quantity of the entire dust (about 500 g) was wetted as thoroughly as possible and suspended in distilled water in tall glass beakers of 5 litre capacity. Settlement was allowed to take place over 24 hours, and at the end of this period the upper half of the fluid containing the finer

TABLE III

Results of intravenous injection of animals with suspensions of mine dust

Rabbit no	Estimated dry weight in mg of total dust injected	Cause of death	Days of survival after first injection
Series II Suspension Cr M 1			
* R VI	280	Killed	371
R VII	280	Lesions caused by dust toxic necrosis	103
* R VIII	280	Killed	371
R IX	280	Pneumonia and acute pericarditis	56
Series III Suspension Cr M 2			
* R X	230	Killed	276
R XI	230	Pneumonia and pleurisy	109
* R XII	96	Cirrhosis of the liver	246
R XIII	230	Embolism following dust injection	28
* R XIV	180	Killed	269

The animals marked with an asterisk showed at autopsy advanced cirrhosis of the liver

particles was decanted off and transferred to fresh glass beakers, where it was allowed to remain undisturbed until complete settlement of this fraction of the dust had taken place. The period for complete settlement occupied about 14 days. The supernatant clear fluid was decanted off and the remaining sludge evaporated to dryness. Two g of the dust, Cr M 1, thus collected were, without further treatment, resuspended in 100 c.c. of normal saline. This suspension, sterilised in the autoclave and finally stored in 5 c.c. ampoules, was used for the injection experiments included in series II, and these proved ultimately to be quite successful. Since it was the writer's aim to produce a suspension containing the finest dust free as far as possible from aggregates and from larger individual particles, drying the dust was eliminated. This was also simpler and more expeditious. After sedimenting the entire dust for 24 hours as before, the upper half of the fluid containing the fine particles was decanted off and passed through a Sharples' centrifuge

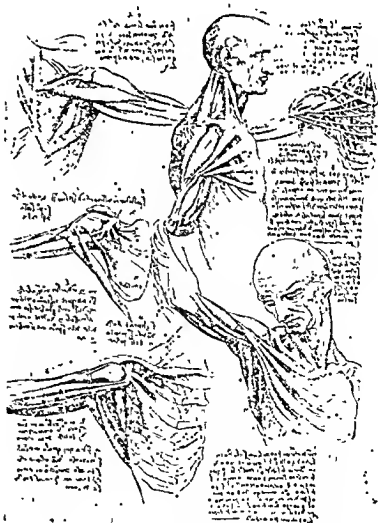
"Not long ago I would not have dared to turn aside even a hair's breadth from Galen. But it seems to me that the septum of the heart is as thick, dense and compact as the rest of the heart. I do not see, therefore, how even the smallest particle can be transferred from the right to the left ventricle through the septum."

In addition to the "Fabrica," Vesalius was the author of several other works, all of which were written before he was in his early thirties. After this tremendous spurt of creative energy, however, his personal life came to a disappointing close. Little is known about his later though still youthful years. He left Padua under a cloud of persecution, having been accused of performing anatomic studies on living bodies. Much of this animosity was really occasioned by his controversial anatomic observations. From Padua he went to Spain to become the personal physician of Charles V, spending his last years in the quiet and obscurity of the Spanish court. He died on a voyage to Jerusalem of unexplained causes. The reason for his trip to the Holy Land is likewise unknown.

If we were to characterize the personalities that led to the flowering of surgery in the Renaissance we should, of course, begin with Vesalius, whom we would describe as the Observer. Vesalius, as we have seen, recorded his observations and brought out his new insight, which differed so much from that of earlier scientists, but on the whole he was content to observe and to record; he was unwilling to fight for the truths he had discovered. It took another personality who loudly and continuously voiced his criticism of unquestioning adherence to tradition and consequently brought upon himself the wrath of his medical contemporaries. This man, the Critic, was Paracelsus, also

known as Philippus Aureolus Theophrastus Bombastus von Hohenheim. He was born in 1493 and died in 1542, two years before Vesalius published his "Fabrica."

Like many of the Renaissance personalities, Paracelsus was a man of wide general education and many interests, which included the entire realm of medicine, chemistry and surgery. Although his surgical writings were fewer than those in other fields, they were incisive and important because they aimed to do away with many of the ancient prejudices. Paracelsus was a learned man, but he was born in the rough mountains of Switzerland, and much of his work reflects his native surroundings more than the academic atmosphere in which he studied later but never felt entirely at home. He disdained the use of Latin, although he knew it, and was the first to use German



Anatomical drawings by Leonardo da Vinci, 1510.



The experiences of Paracelsus, the Critic, and of Vesalius, the Observer, helped to instill caution into the third great figure of Renaissance surgery, Ambroise Paré. Paré, the Experimenter, was born in 1510 and died in 1590. He was entirely different from the two other medicosurgical heroes of the Renaissance. Vesalius and Paracelsus were well educated: Vesalius had laboriously demonstrated that Galen's facts were false. Paracelsus had rebelled against tradition and attacked Galen with violence. Paré was not educated. His incentive was not rebellion, it was not even the conscious desire for scientific observation, it was compassion for those who suffered. He was born in 1510 and had been apprenticed as a boy to a barber. During his apprenticeship he clipped the hair of his clients, he shaved and bled them, he pulled their teeth and dressed their wounds, and with all these ministrations he felt more and more attracted to surgery. In order to learn more about surgery, he went to the Hôtel Dieu (Hospital of God), which is still a place of refuge for those for whom society does not make other provisions. In Paré's days it was a dirty and totally neglected place, and the nursing staff, composed of sisters of charity, was entirely untrained. Each bed was occupied by several patients, and the operating room was in the corner of the vestibule. It was here that Paré received the beginnings of his surgical education.

In 1536 the war, which had helped Vesalius in his decision to leave Paris, called Paré into the Army. He became a regimental surgeon, and while the French laid siege to Turin Paré saw with helpless compassion how badly mutilated and wounded soldiers whom he could not help were relieved of their suffering by being shot by an old soldier. In the course of this campaign, which reached Milan, Paré introduced his first great innovations

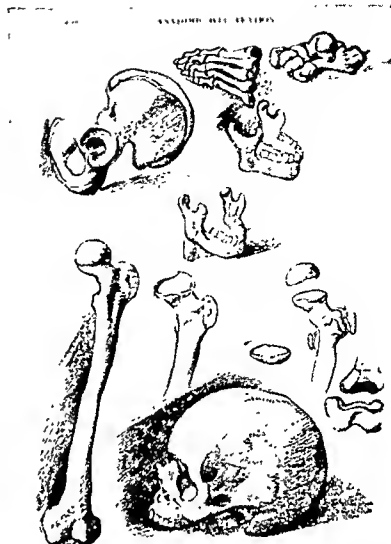


Illustration by René Chailly. Made by J. van Kalkreuth in the Vesalius Tradition.

From *De Corporis Humani Fabrica*, 1543, by Andreas Vesalius.

concerning the treatment of gunshot wounds. Gunshot wounds were the new features of warfare, as fearful and awesome as the newest weapons appear to us now.

Gunpowder had been invented in 1320 by Berthold Schwartz and guns and cannons were in general use in the fifteenth century. In the sixteenth century muzzle-loading arquebuses had been developed, which emitted balls of the size of a walnut and inflicted horrible wounds. The earlier weapons, swords, lances, and battle axes, had made clear, open wounds that were usually but slightly infected, but the gunshot wounds were deep and narrow; they usually contained bits of clothes and filth and led to severe infections.

Somewhat earlier Giovanni de Vigo, a

lived for 246 days or longer after the first injection, showed enlarged livers with unevenly distributed cirrhosis. Some parts were distinctly granular or even nodular, other parts were unchanged. The only other noteworthy macroscopic manifestations of the effects of dust were enlargement of groups of lymph nodes and of the spleen. The spleen was largest in rabbits R X and R XIV, both of which received injections of dust consisting almost wholly of particles of 0.8μ diameter or less.

The lungs, suprarenals and kidneys of the rabbit which died after 56 days showed no microscopic changes attributable to silicious dust. In the spleen there were hyperplasia of the lymphoid tissue and dilatation of the sinuses with proliferation of the lining cells. Large numbers of mononuclear phagocytes containing particles of fine dust were seen in the sinuses and in the lymphoid tissue of the malpighian bodies. There was no evidence of fibrosis. In the liver mononuclear phagocytes containing fine dust particles and lymphocytes were present as small collections at the periphery of the portal tracts and along the interlobular lines. There was no fibrosis.

Sections of the lungs and kidneys of rabbits R VII and R XI, which died after 103 and 109 days respectively, showed a few embolic foci surrounded by a slight lymphocytic reaction. In the spleen much mineral dust lying free or contained in mononuclear phagocytes and multinucleated giant cells was noted, but fibrosis was still not a noticeable feature. The liver showed accumulations of mononuclear phagocytes and multinucleated giant cells containing mineral particles in relation to portal spaces, along the interlobular lines and in the neighbourhood of the central veins. Rabbit R VII showed areas of toxic necrosis of the hepatic cells adjacent to the central veins. In the liver of both animals there was evidence of commencing cirrhosis as shown by early connective tissue increase and lymphocytic infiltration, chiefly affecting the portal spaces and interlobular lines.

Microscopic examination of the lungs and kidneys of rabbits R VI, R VIII, R X, R XII and R XIV, which died after 246 to 371 days, showed a few embolic foci, in all of which a tendency to heal was noted. In the spleen there were large deposits of dust, a little of it lying free but most of it contained in large mononuclear phagocytes and giant cells in the sinuses, pulp and lymphoid tissue, there was a slight connective tissue increase. In the liver there was a characteristic nodular type of fibrous tissue increase (figs 3 and 4), portal in distribution, similar to that described by Gardner and others in animals injected with suspensions of finely divided pure silica. It will be noted that extensive lesions have developed in the liver of these animals within a relatively short time, the longest period of experimental life in the series being 371 days.

Enlarged mesenteric lymph nodes from rabbits R VI, R VIII,

vented a number of prostheses: artificial eyes, and arms and legs which even had a mechanism to bring about their movement. He recommended and practiced postoperative massage and implanted teeth, which were taken from paid living donors.

It is interesting that this theory of the possibility of implanting teeth taken from donors persisted for several centuries after Paré. Even John Hunter practiced this method and wrote on it, expressing his complete conviction that teeth thus grafted would take root and be usable in their new environment. Altogether, most of Paré's inventions entered surgical practice sooner or later. Their impact was not as immediate as was to be expected, because of Paré's humble origin and the fact that he did not belong to the "inner circle" of scholars, but it is entirely owing to Paré that surgery became a skilled craft. Paré based his surgical operations on the anatomic writings of Vesalius and was thus the first surgeon to relate surgery to anatomy. Significantly, Paré had to keep his reliance on Vesalius' works a secret as long as Sylvius, Vesalius' teacher, was alive in Paris. Paré's position in the hierarchy of medicine was too uncertain for him to admit his spiritual fellowship with one who had disproved Galen. With the death of Sylvius this caution was no longer needed, and Paré's later writings rely openly on the works of Vesalius.

Paré's surgery remained the preferred mode of surgery for two hundred years, that is, until the arrival of the great surgical scientists of the eighteenth and nineteenth centuries. It took John Hunter to turn surgery into a science, Joseph Lister to introduce antisepsis to prevent infection, and the Americans, Long, Wells, and Morton, to provide the blessings of anesthesia and to abolish pain in operations. As was said earlier, Paré raised surgery from a trade followed by menials to a

skilled craft carried out by trained men. After Paré's time, surgery became more and more a part of medical education, and the distinction between the "surgeons of the long robe" and the "surgeons of the short robe" was broken down. Surgery and the surgeon had become respectable.

Throughout his writings one cannot help to be impressed by Paré's gentleness and humility. Over and over again he stated his credo concerning his success with every one of his patients. "I dressed his wounds—God healed him," is his recurring summary of each recovery. His accidental use of the controlled experiment led him to perform others and to be inclined toward experimentation in general. Thus, when once called to treat a man whose face had been badly burned, Paré decided to try out a remedy of which he



Anatomic plate from the works of Pietro Berrettini's *Tabulae Anatomicae*, Rome, 1741.

vented a number of prostheses: artificial eyes, and arms and legs which even had a mechanism to bring about their movement. He recommended and practiced postoperative massage and implanted teeth, which were taken from paid living donors.

It is interesting that this theory of the possibility of implanting teeth taken from donors persisted for several centuries after Paré. Even John Hunter practiced this method and wrote on it, expressing his complete conviction that teeth thus grafted would take root and be usable in their new environment. Altogether, most of Paré's inventions entered surgical practice sooner or later. Their impact was not as immediate as was to be expected, because of Paré's humble origin and the fact that he did not belong to the "inner circle" of scholars, but it is entirely owing to Paré that surgery became a skilled craft. Paré based his surgical operations on the anatomic writings of Vesalius and was thus the first surgeon to relate surgery to anatomy. Significantly, Paré had to keep his reliance on Vesalius' works a secret as long as Sylvius, Vesalius' teacher, was alive in Paris. Paré's position in the hierarchy of medicine was too uncertain for him to admit his spiritual fellowship with one who had disproved Galen. With the death of Sylvius this caution was no longer needed, and Paré's later writings rely openly on the works of Vesalius.

Paré's surgery remained the preferred mode of surgery for two hundred years. That is, until the arrival of the great surgical scientists of the eighteenth and nineteenth centuries. It took John Hunter to turn surgery into a science, Joseph Lister to introduce antiseptics to prevent infection, and the Americans, Long, Wells, and Morton, to provide the blessings of anesthesia and to abolish pain in operations. As was said earlier, Paré raised surgery from a trade followed by menials to a

skilled craft carried out by trained men. After Paré's time, surgery became more and more a part of medical education, and the distinction between the "surgeons of the long robe" and the "surgeons of the short robe" was broken down. Surgery and the surgeon had become respectable.

Throughout his writings one cannot help to be impressed by Paré's gentleness and humility. Over and over again he stated his credo concerning his success with every one of his patients. "I dressed his wounds—God healed him," is his recurring summary of each recovery. His accidental use of the controlled experiment led him to perform others and to be inclined toward experimentation in general. Thus, when once called to treat a man whose face had been badly burned, Paré decided to try out a remedy of which he



Anatomic plate from the works of Pietro Berrettini's *Tabelle Anatomiche*, Rome, 1741.

The second and third series of experiments recorded above showed that an untreated mixed dust of high silica content, injected intravenously, is capable of producing distinctive lesions, especially fibrosis, in the liver, spleen and lymph nodes of the experimental animals and that these lesions may reach an advanced stage in about 250 days

The bone marrow was not examined in the present investigation but changes in this tissue were observed by Gardner and Cummings (1933). All these organs have sinusoids interposed in the circulation. Further it has been found, both in the present investigation and in those of the observers mentioned, that no distinctive dust lesions were seen in any other organ. The sinusoidal organs are provided with a special type of phagocytic mechanism which deals with foreign particulate matter present in the blood stream, and it would appear that no reaction on the part of the phagocytic cells takes place unless the particles come in contact with the lining membrane of the sinusoid.

In this respect the differences in the response of the lung tissue to particulate mineral matter according as this is introduced into the lung *via* the blood stream or by way of the air passages are of particular interest. If a very fine silicious dust, the individual particles of which remain dispersed, is introduced into the circulation of rabbits no significant lesions develop in the deep substance of the lung. On the other hand, as shown by Mavrogordato (1921-24), Gardner and Cummings (1931), Kettle (1934) and others, a definite reaction occurs when noxious dust is introduced into the alveoli by intratracheal injection. When the particles reach the alveoli certain of the lining cells become actively phagocytic and in course of time distinctive lesions develop in the interstitial tissues of the lungs and in the regional lymph nodes. The behaviour of the alveolar phagocytes towards air-borne particulate matter introduced into the alveoli either naturally by inhalation or artificially by intratracheal injection is thus similar to that of the phagocytic cells of the blood sinusoids in the liver, spleen and lymph nodes towards particulate matter introduced by injection into the circulating blood. The distinctive fibrous reaction to the silicious dust is also practically identical in the two cases.

The lesions resulting from the intravenous injection into rabbits of a mixed air-borne mine dust are substantially the same as those described by Gardner and Cummings as resulting from the injection of quartz dust alone. A more pronounced splenic reaction was seen in our animals, however. The dust used in the present investigation appears to be highly toxic.

The results of the second and third series of experiments recorded above provide further evidence that fibrotic lesions of silicotic type can be produced by intravenous injections of

A group of pupils of the late master, therefore, has undertaken complete revision of the book. They have conserved his general plan, although certain chapters have been modified or recast and entirely new ones inserted to deal with all the new findings. The novel therapeutic applications by endo-rectal ways have been specified, particularly contact radiotherapy. The chapter on blood dyscrasias is completely new and has never before been published.

To the magnificent iconographic emplementation of the old edition have been added forty new aquarelles, taken from Bensaude's collection as well as from those of the editors. The number of pictures in black has been notably increased: radiologic aspects shown, as are the photographs of surgical pieces, specimens, histologic sections and endoscopic observations.

The 39 color plates, if published separately, would make a magnificent atlas in themselves. This collection is indispensable to every gastroenterologist, and it is particularly valuable for teaching purposes. The legends stand opposite each plate and are presented in French, English, Spanish, German, Italian and Portuguese.

M. T.

Gynecologic Therapy. By William Bickers. Springfield, Ill.: Charles C Thomas, Publisher, 1957. Pp. 158.

In spite of its title, this book presents clinical diagnosis as well as therapy. Surprisingly, there is no foreword or preface, and there are no illustrations. According to the advertising on the jacket, the book was written as a manual for senior medical students, residents and young general practitioners. The treatment recommended was chosen from the work of leading gynecologists as well as from the author's experience. The subjects covered are the vulva and introitus, the vagina, the cervix, the corpus, the fallopian tubes, the ovary, menstrual irregularities, dysmenorrhea and premenstrual tension, endometriosis, sterility, abortion, ectopic pregnancy, hydatidiform mole and chorionepithelioma, leukorrhea, hirsutism and intersexuality, and menopause and climacteric.

This book can be definitely recommended to the young men and women for whom it was written, because it contains authoritative information and advice based on the writings of leading gynecologists and the author's extensive personal experience as a practicing gynecologist, teacher and investigator.

J. P. GREENHILL, M.D.

Synopsis of Pathology. By W. A. D. Anderson. St. Louis: The C. V. Mosby Company, 1957, 4th ed. Pp. 829, with 328 illustrations and 12 color plates.

The fourth edition of this well known book follows, in its outline, the previous edition. As is to be expected from a scholar like Dr. Anderson, every chapter has been revised to keep in step with the latest knowledge in the field of pathology.

Considering the difficulties of condensing the tremendous field of pathology into a small synopsis, the reviewer must admire the result of the author's work. Needless to say, this synopsis is not intended to replace textbooks for students, but in the reviewer's opinion it represents a complete summary of the important features in general and special pathology.

The book is a "must" in the library of every pathologist and would be a valuable addition to that also of every physician interested in the basic principles of medicine.

WERNER F. EISENSTAEDT, M.D.

The Treatment of Fractures. By Lorenz Böhler. New York and London: Grune & Stratton, Inc., 1957. 5th ed., vol. 2. Pp. 435, with 941 illustrations.

Volume 2 of the fifth edition of this impressive set of reference books, dealing with fractures and other injuries of the spine and extremities, was translated from the thirteenth German edition by Otto Russe, M. D., Director of the Accident Hospital of Vienna, where most of Böhler's work has been carried on for many years, and by R. G. B. Bjornson, M. D., who is listed as a Diplomate of the American Board of Radiology.

This book is devoted entirely to the diagnosis and treatment of fractures or disloca-

Abstracts from Current Literature

Primary Malignant Neoplasms of the Duodenum. Ochsner, S., and Kleckner, M. S. Jr. *J.A.M.A.* 163:413, 1957.

Only radiologic diagnosis can provide early enough recognition of tumors involving the duodenum to allow resection of the lesion. While the radiologist must be particularly alert to the less common lesions of the alimentary tract, he must be equally aware of the factors that may obscure the lesions during the examination.

Of 17 duodenal lesions observed at the Ochsner Clinic, 14 were diagnosed as adenocarcinoma and 3 as sarcoma.

The tumors were classified into suprapapillary, peripapillary, and intrapapillary types, each of which has rather characteristic clinical manifestations.

Prompt surgical exploration and excision or palliative procedures should be carried out.

WILLIAM E. NORTH, M.D.

Pulmonary Cystic Disease: Physiologic Studies and Results of Resection. Siebens, A. A.; Grant, A. R.; Kent, D. C.; Klopstock, R., and Cinotti, J. J. *J. Thoracic Surg.* 33: 185, 1957.

Pulmonary cystic disease is discussed from the standpoint of interpretation of pulmonary functional tests, variability in physiologic deficit and end results of excisional therapy. Six cases are reported in detail. No characteristic abnormality accompanies pulmonary cystic disease. Large cysts may produce minimal or extensive physiologic deficits. The patency of the communication, the index of alveolar mixing and the degree of compression of the surrounding normal lung are important factors in determining the ultimate prognosis. Excisional therapy of the cysts produces excellent results from both the symptomatic and the physiologic point of view.

ERNEST G. DEBAKEY, M.D.

Pneumoperitoneum as a Space-Occupying Procedure in Conjunction with Pulmonary Resection. Baechner, H. A.; Ziskind, M. M., and Strug, L. H. *J. Thoracic Surg.* 33:229, 1957.

In the authors' opinion a "space-occupying procedure" is not necessary after pulmonary resection from the standpoint of preventing overdistention of the remaining lung but should be considered in order to preserve pulmonary function, eliminate dead space and prevent reactivation of residual foci of tuberculosis. They are convinced that artificial pneumoperitoneum will serve this purpose. They found this procedure is selective, produces no deformity or complications and is simple to perform. It is instituted several weeks before the operation and two weeks thereafter and is maintained for two months.

ERNEST G. DEBAKEY, M.D.

Proctosigmoidoscopy: Incidence of Polyps in 50,000 Examinations. Porres, C., and Majarakis, J. D. *J.A.M.A.* 163:411, 1957.

Proctosigmoidoscopic study was accomplished in 50,000 cases, with 1 instance only of perforation, by observing these precautions: digital examination of the rectum before inserting the instrument, blind insertion of the instrument only as far as the finger had explored, infrequent use of air inflation, special care in passing diseased segments, and care not to push the instrument forcibly against the intestinal wall until the lumen ahead had been identified. All subjects were asymptomatic and between the ages of 20 and 76. Polyps were observed in 3,952 cases. Of these, 323 were malignant. In addition, 19 instances of moderately advanced rectal carcinoma were noted.

Digital examination and proctosigmoidoscopic study are effective in the early detection of malignant neoplasm. The early removal of rectal polyps will prevent many carcinomas of the colon.

WILLIAM E. NORTH, M.D.

Abstracts from Current Literature

Primary Malignant Neoplasms of the Duodenum. Ochsner, S., and Kleckner, M. S. Jr., J.A.M.A. 163:413, 1957.

Only radiologic diagnosis can provide early enough recognition of tumors involving the duodenum to allow resection of the lesion. While the radiologist must be particularly alert to the less common lesions of the alimentary tract, he must be equally aware of the factors that may obscure the lesions during the examination.

Of 17 duodenal lesions observed at the Ochsner Clinic, 14 were diagnosed as adenocarcinoma and 3 as sarcoma.

The tumors were classified into suprapapillary, peripapillary, and intrapapillary types, each of which has rather characteristic clinical manifestations.

Prompt surgical exploration and excision or palliative procedures should be carried out.

WILLIAM E. NORTH, M.D.

Pulmonary Cystic Disease: Physiologic Studies and Results of Resection. Siebens, A. A.; Grant, A. R.; Kent, D. C.; Klopstock, R., and Cinotti, J. J., J. Thoracic Surg. 33: 185, 1957.

Pulmonary cystic disease is discussed from the standpoint of interpretation of pulmonary functional tests, variability in physiologic deficit and end results of excisional therapy. Six cases are reported in detail. No characteristic abnormality accompanies pulmonary cystic disease. Large cysts may produce minimal or extensive physiologic deficits. The patency of the communication, the index of alveolar mixing and the degree of compression of the surrounding normal lung are important factors in determining the ultimate prognosis. Excisional therapy of the cysts produces excellent results from both the symptomatic and the physiologic point of view.

ERNEST G. DEBAKEY, M.D.

Pneumoperitoneum as a Space-Occupying Procedure in Conjunction with Pulmonary Resection. Buechner, H. A.; Ziskind, M. M., and Strug, L. H., J. Thoracic Surg. 33:229, 1957.

In the authors' opinion a "space-occupying procedure" is not necessary after pulmonary resection from the standpoint of preventing overdistention of the remaining lung but should be considered in order to preserve pulmonary function, eliminate dead space and prevent reactivation of residual foci of tuberculosis. They are convinced that artificial pneumoperitoneum will serve this purpose. They found this procedure is selective, produces no deformity or complications and is simple to perform. It is instituted several weeks before the operation and two weeks thereafter and is maintained for two months.

ERNEST G. DEBAKEY, M.D.

Proctosigmoidoscopy: Incidence of Polyps in 50,000 Examinations. Portes, C., and Marjakis, J. D., J.A.M.A. 163:411, 1957.

Proctosigmoidoscopic study was accomplished in 50,000 cases, with 1 instance only of perforation, by observing these precautions: digital examination of the rectum before inserting the instrument, blind insertion of the instrument only as far as the finger had explored, infrequent use of air inflation, special care in passing diseased segments, and care not to push the instrument forcibly against the intestinal wall until the lumen ahead had been identified. All subjects were asymptomatic and between the ages of 20 and 76. Polyps were observed in 3,952 cases. Of these, 328 were malignant. In addition, 19 instances of moderately advanced rectal carcinoma were noted.

Digital examination and proctosigmoidoscopic study are effective in the early detection of malignant neoplasm. The early removal of rectal polyps will prevent many carcinomas of the colon.

WILLIAM E. NORTH, M.D.

TABLE I

Titration of the quantity of virus in the lungs of mice which succumbed after the introduction of a lethal dose

Lung dilution from dead mice	Serial passages in white mice		
	1st	2nd	3rd.
10 ⁻⁴	4+		
	4+		
	4+		
10 ⁻⁵	4+		
	2	4+	
	3	4+	
10 ⁻⁶	1	4+	
	2	4+	
	2	4+	
10 ⁻⁷	1	4+	
	0	4+	
	0	4+	
10 ⁻⁸	0	4+	
	0	4+	
	0	4+	
10 ⁻⁹	0	4+	
	0	4+	
	0	4+	
10 ⁻¹⁰	0	4+N	
	0	4+N	
	0	4+N	
10 ⁻¹¹	0	4+N	
	0	4+N	
	0	4+N	
10 ⁻¹²	0	4+N	
	0	1	4+N
	0	0	4+N
10 ⁻¹³	0	0	0
	0	0	0
	0	0	0

0 = mouse with no detectable influenzal lesions *post mortem*

1 = mouse killed on 6th day, influenzal pneumonia involving upwards of $\frac{1}{4}$ of lung *post mortem*

2 = mouse killed on 6th day, influenzal pneumonia involving from $\frac{1}{4}$ to $\frac{1}{2}$ of lung *post mortem*

3 = mouse killed on 6th day, influenzal pneumonia involving from $\frac{1}{2}$ to $\frac{3}{4}$ of lung *post mortem*

4 = mouse killed on 6th day, influenzal pneumonia involving $\frac{3}{4}$ to whole of lung *post mortem*

4+ = mouse dead by 6th day with influenzal pneumonia involving entire lung

4+N = presence of virus in 4+ lungs as ascertained by means of neutralisation test with specific immuno serum

CATARACT SURGERY

BY

ROBERT H. G. MONNINGER, M.S., M.D.

EVANSTON, ILLINOIS

The delineations of the technique of intracapsular lens extraction as discussed in Arruga's textbook of Ocular Surgery are many ranging from the method of akinesia and anesthesia to the stages of operation and instruments used. This article will describe in general Arruga's method of cataract surgery.

Anesthesia is effected by topical instillation of 3% cocaine, or a derivative, and 1:1000 adrenalin, combined with a 1 cc. retrobulbar injection of 2% novocain, or a derivative, made through the lower lid or through the conjunctiva with the lower lid pulled downward. The Van Lint-Rochat technique for akinesia of the orbicularis muscle is employed using a mixture of 2% novocain and adrenalin. A blepharostat is used to retract the lids, and a canthotomy may be performed to further widen the lid opening. A suture is passed through the tendon of the superior rectus muscle and held by an assistant to fixate the globe. The conjunctiva and episclera of the lower hemisphere are held with fixation forceps preparatory to making the corneal section. Using a Graefe knife the puncture is made in the maximal horizontal diameter and 1 mm. from the conjunctival limbus, and the counter-puncture is made on the opposite side 1 mm. from the corneal limbus. The section is then continued in the limbus, inclining the blade upward or backward depending on whether the intent is to complete the cut in the cornea, or to leave a conjunctival flap. A central suture is placed, passing through limbal conjunctiva and the posterior edge of the section, or through the center of both lips of the wound. A knot is made and the suture is left slack. A peripheral iridectomy, or two iridotomies, one on each side of the central suture, is performed by having the assistant raise the cornea while the surgeon grasps the root of the iris with an iris forceps and cuts it with a de Wecker scissors. If blood appears in the anterior chamber, it is removed by cannula irrigation. A cataract hook is held in one hand and placed in the lower cul-de-sac while the closed lens forcep is introduced into the wound and passed across the pupil to lie on the anterior-inferior surface of the lens below the iris. The forceps is lifted and opened 4 mm. and the lens is pressed backward slightly. The forceps is closed and the lens is pulled toward the pupil and rocked from side to side. After the lens is freed inferiorly, the hook is placed at the lower limbus and moved toward the wound opening while the forceps rotation is continued. The lens is expelled, its lower surface clearing the posterior surface of the cornea and emerging first. This is the tumbling technique. The iris is replaced with a spatula and the wound suture is tied. Two more sutures are placed, one on each side of the central suture. Antiseptic and miotic ointments are instilled, and a dressing is applied with a protective device over this, and held in place with an adhesive substance.



The Traveling Man from Mager & Gougelman

Eddie Kerr has helped physicians fit thousands of patients with artificial eyes. Like the other experts from our offices, he provides you with technical information and assistance on difficult cases. The samples in his case will match many patients. Or, he can make eyes that perfectly match with the materials he carries. One of our experienced men visits most areas regularly—another reason to call or write our nearest office for your next ocular prosthesis.

Complete Artificial Eye Service

- Eyes custom made—glass or plastic
- Eyes from stock sent on same day order received—glass or plastic
- Damaged or broken eyes accurately matched
- Fitted to all types of mobility implants
- Implants, X-Ray therapy shields, foreign body locators
- Superior Quality—Finest Workmanship

Mager and Gougelman, Inc.

CLEVELAND DETROIT HOUSTON (Super Eyes)
KANSAS CITY MINNEAPOLIS ST. LOUIS
BOSTON PHILADELPHIA PITTSBURGH WASHINGTON

TABLE II *Distribution of virus in infected mice shortly before death*

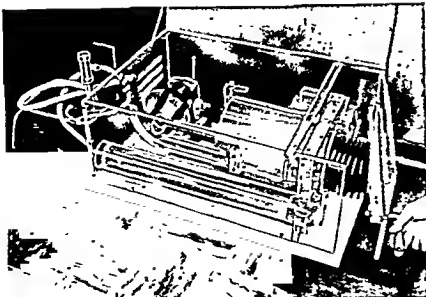
	Pas age			
	1st	2nd	3rd	4th
Lungs	4+			
	4+			
	4+			
Pleural cavity	0	4+	4+	
	0	4+	4+	
	0	2	4+	
Blood	0	3	4+	
	0	4	4+	
	0	4	4+	
Spleen	0	1	4+	
	0	1	4+	
	0	2	4+	
Bile	0	1	4+	
	0	2	4+	
	0	3	4+	
Urine (from bladder)	0	3	4+	
	0	4	4+	
	0		4+	
Contents of small intestine	0	0	0	0
	0	0	0	0
	0	0	0	0

Symbols as in table I

TABLE III *The spread of the virus from the lungs to the blood and urine of infected mice*

Mice killed after inoculation of virus	Blood of infected and killed mice in various dilutions						Urine of mice in various dilutions							
	1st passage			2nd passage			1st passage				2nd passage			
	1	1	100	1	10 000		1	1	100	10 000	1	1	100	10,100
	1	1	100	1	10 000		1	1	100	10 000	1	1	100	10,100
24 hrs	4+	2	0	4+	4+	4+	0	0	0		4+	4+	4+	
	0	3	0	4+	4+	0	0	0	0		4+	4+	4+	
	0	0	0	4+	4+	0	0	0	0		4+	4+	4+	
48 hrs	0	0	0	4+	0	0	3	0	0		4+	4+	0	
	0	0	0	4+	0	0	3	0	0		4+	4+	0	
	0	0	0	4+	0	0	3	0	0			4+	0	
72 hrs	0	0	0	4+	4+	0	0	0	0		4+	4+	4+	
	0	0	0	4+	4+	0	0	0	0		4+	0	0	
	0	0	0	4+	4+	0	0	0	0		4+	0	0	
96 hrs	4+	0	0	4+	4+	4+	4+	0	0		4+	4+	4+	
	4+	0	0	4+	4+	0	0	0	0		4+	4+	0	
	0	0	0	4+	4+	0	0	0	0		4+	0	0	
120 hrs	4+	0	0	4+	4+	4+	4+	0	0		4+	4+	4+	
	0	0	0	4+	4+	4+	1	2	0		4+	0	4+	
	0	0	0	4+	0	0	1	2	0		4+	0	4+	

Symbols as in table I



MÖRCH PISTON RESPIRATOR

Especially valuable in prevention of paradoxical respiration in crushing injuries of the chest; also in postoperative respiratory insufficiency, poliomyelitis, brain injuries, barbiturate poisoning. Most effective when used with Mörch Swivel Tracheostomy Tubes . . .

#BE-214 (Size 4)Each \$20.50

#BE-216 (Size 6)Each 20.50

or

#BE-218 (Size 8)Each 22.50

For continuous mechanical hyperventilation

(As Described in Armamentarium Vol. II—No. VIII)
#AS-1665..Each \$1,290.00 (with 2 exhalation valves).



V. MUELLER & CO.

330 South Monroe Street
Chicago 12, Illinois
Dallas • Houston • Los Angeles • Rochester, Minn.

HAVE YOU CHANGED YOUR ADDRESS?

To insure uninterrupted delivery of your *Journal* please return this coupon or send the same information on a post card to *Journal of the International College of Surgeons, Circulation Office, 10 Columbus Circle, New York 19, N. Y.*

Name _____ Please print

Former Address: _____ New Address: _____

Street _____ Street _____

City _____ City _____

Zone _____ State _____ Zone _____ State _____

For countries outside the United States:

Name of Country _____

TABLE V *Fate of virus after intraperitoneal inoculation into mice (1,000,000 lethal doses)*

Time of killing mice (after inoculation)	Content of virus in peritoneal cavity											
	1st infection						1st passage					
	Dilutions of peritoneal washings											
	10 ⁻¹	10 ⁻²	10 ⁻³	10 ⁻⁴	10 ⁻⁵	10 ⁻⁶	10 ⁻¹	10 ⁻²	10 ⁻³	10 ⁻⁴	10 ⁻⁵	10 ⁻⁶
Immediately	4+	4+	4+	4+	4+	4+						
	4+	4+	4+	4+	4+	2						
	4+	4+	4+	4+	4+	2						
4 hrs	4+	4+	4+	4+	0	0					4+	4+
	4+	4+	4+	1	0	0					4+	4+
	4+	4+	4+	1	0	0					4+	4+
24 hrs	4+	2	0	0	0	0		4+	4+	4+	4+	0
	4+	2	0	0	0	0		4+	4+	4+	4+	0
	4+	0	0	0	0	0		4+	4+	4+	4+	0
48 hrs	0	0	0	0	0	0	4+	0	0	0	0	
	0	0	0	0	0	0	4+	0	0	0	0	
	0	0	0	0	0	0	4+	2	0	0	0	
72 hrs	0	0	0	0	0	0	4+	0	0	0	0	
	0	0	0	0	0	0	4+	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	
96 hrs	0	0	0	0	0	0	0	0	0	0		
	0	0	0	0	0	0	0	0	0	0		
	0	0	0	0	0	0	0	0	0	0		
Time of killing mice (after inoculation)	Content of virus in blood.											
	1st infection						1st passage					
	Dilutions of blood											
	10 ⁻¹	10 ⁻²	10 ⁻³	10 ⁻⁴	10 ⁻⁵	10 ⁻⁶	10 ⁻¹	10 ⁻²	10 ⁻³	10 ⁻⁴	10 ⁻⁵	10 ⁻⁶
Immediately	0	0	0	0	0		4+	4+	4+	0	0	
	0	0	0	0	0		4+	4+	4+	0	0	
	0	0	0	0	0		4+	4+	4+	0	0	
4 hrs	0	0	0	0	0		4+	4+	4+	4+	4+	
	0	0	0	0	0		4+	4+	4+	3	0	
	0	0	0	0	0		4+	4+	4+	3	0	
24 hrs	0	0	0	0			4+	4+	0	0		
	0	0	0	0			4+	2	0	0		
	0	0	0	0			0	2	0	0		
48 hrs	0	0	0				0	0	0			
	0	0	0				0	0	0			
	0	0	0				0	0	0			
72 hrs	0	0	0				0	0	0			
	0	0	0				0	0	0			
	0	0	0				0	0	0			
96 hrs	0	0	0				0	0	0			
	0	0	0				0	0	0			
	0	0	0				0	0	0			

Symbols as in table I



The Journal of the International College of Surgeons

FOUNDED BY DR. ANDRÉ CHOTI

Section II

Vol. XXVII

No. 4

May-June, 1957

Editor-in-Chief

Max Thorek, M.D., Sc.D., LL.D., F.B.C.S. (Hon.),
F.I.C.S. (Hon.), F.P.C.S. (Hon.), F.R.S.M. (Eng.)

Associate Editor

Phillip Thorek, M.D., F.A.C.S., F.I.C.S.

Consulting Editor

Morris Fishbein, M.D., F.I.C.S. (Hon.)

Assistant Editor

Dorothy Langley

High Honors to Prof. Carlos Gama, page 3
Comments by the Founder, page 4
The Executive Director's Notebook, page 6
Who's Who in the International College of Surgeons, page 9
College Life Insurance Plan, page 11
A Trip Around the World: Second Annual Clinical Course,
International College of Surgeons, page 12
Neal Owens, M.D., F.A.C.S., F.I.C.S.
Tenth International Congress, page 24

CONTENTS

SECTION NEWS

United States Section, The President's Message, page 31
Western Regional Meeting, page 33
Eastern Regional Meeting, page 35
New York State Surgical Division, page 41
Woman's Auxiliary, page 45
Costa Rica Section, page 47
Finnish Section, page 47
French Section, page 47
Netherlands Section, page 49
Japan Section, page 50
In Memoriam, page 51

3 Distribution of the virus outside the lungs does not exclude its classification as a pneumotropic virus, since actual multiplication of the virus can occur only in the lungs

4 Virus inoculated even in very large doses intravenously or intraperitoneally does not cause metastasis in the lungs and is destroyed or eliminated very rapidly in the tissues of the mouse, disappearing completely in two or three days

REFERENCES

- | | |
|---|--|
| LAIDLAW, P P | <i>Lancet</i> , 1935, i 1118 |
| ORCUTT, M L, AND SHOPE, R E | <i>J Exp Med</i> , 1935, lxi 823 |
| SMITH, W, ANDREWES, C H, AND LAIDLAW, P P | <i>Lancet</i> , 1933, ii 66 |
| WALDMANN, O | <i>Deutsch med Wschr</i> , 1935, lxi 8 |



The Journal of the International College of Surgeons

FOUNDED BY DR. ANDRÉ CROTTI

Section II

Vol. XXVII

No. 4

May-June, 1957

Editor-in-Chief

Associate Editor

Consulting Editor

Assistant Editor

Max Thorek, M.D., Sc.D., LL.D., F.B.C.S. (Hon.),
F.I.C.S. (Hon.), F.P.C.S. (Hon.), F.R.S.M. (Eng.)

Philip Thorek, M.D., F.A.C.S., F.I.C.S.

Morris Fishbein, M.D., F.I.C.S. (Hon.)

Dorothy Langley

High Honors to Prof. Carlos Gama, page 3
Comments by the Founder, page 4
The Executive Director's Notebook, page 6
Who's Who in the International College of Surgeons, page 9
College Life Insurance Plan, page 11
A Trip Around the World: Second Annual Clinical Course,
International College of Surgeons, page 12
Neal Owens, M.D., F.A.C.S., F.I.C.S.
Tenth International Congress, page 24

CONTENTS

SECTION NEWS

United States Section, The President's Message, page 31
Western Regional Meeting, page 33
Eastern Regional Meeting, page 35
New York State Surgical Division, page 41
Woman's Auxiliary, page 45
Costa Rica Section, page 47
Finnish Section, page 47
French Section, page 47
Netherlands Section, page 49
Japan Section, page 50
In Memoriam, page 51

of hydrochloric acid the pigment of *Ps pyocyanea* was changed to a red colour, seemed important, as the tests for indole usually used, Böhme's or the nitroso-indole test, both involve the addition of acid to the culture and the production of a red colour

In testing our strains we used Böhme's reagent and also the method of Holman and Gonzales (1923) as a control This latter

TABLE II
Reactions of fifty strains of Ps pyocyanea

Origin of strain	Number	Böhme's indole test	Liquefaction of gelatin	Reduction of nitrate broth	Peptonisation of litmus milk
Urine	Tested	18	7	8	8
	Positive	8	4	1	5
	Negative	10	3	7	3
Blood culture, P M	Tested	18	5	6	6
	Positive	16	5	0	6
	Negative	2	0	6	0
Water supplies	Tested	8	8	6	8
	Positive	0	8	1	8
	Negative	8	0	5	0
Fæces	Tested	2	2	2	2
	Positive	1	2	0	2
	Negative	1	0	2	0
Blood culture	Tested	2	0	0	0
	Positive	0			
	Negative	2			
Throat swab	Tested	1	1	1	1
	Positive	0	1	0	1
	Negative	1	0	1	0
Boil in ear	Tested	1	1	1	1
	Positive	1	1	0	1
	Negative	0	0	1	0
Totals	Tested	50	24	24	26
	Positive	26	21	2	23
	Negative	24	3	22	3

All strains produced acid from glucose, none fermented lactose, mannitol or sucrose, all gave a negative Holman Gonzales indole test

Origin of strains

Urine, fæces = urine or fæces sent to be examined for enterica

Blood culture, P M = post mortem blood cultures in patients suspected of plague

Blood culture = blood cultures from patients suspected of enterica

test consists in the inclusion with the wool plug of a strip of filter paper previously soaked in a saturated solution of oxalic acid and sterilised We have often compared this method with Böhme's and obtained similar results Bardsley (1934) in a series of five hundred and sixty-six parallel tests found the oxalic acid method to be slightly more sensitive

High Honors to Prof. Carlos Gama

President, International College of Surgeons

To the long list of awards and distinctions earned by Prof. Dr. Carlos Gama, F.I.C.S., President of the International College of Surgeons, has been added still another, his appointment as Secretary of Health and Social Assistance of the State of São Paulo. The appointment was made by Governor Janio Quadros and was formally accepted by Prof. Gama on March 28 at the Secretariat headquarters, in the presence of many State dignitaries gathered to do him honor.

The State Secretary of Justice, Dr. Lincoln Feliciano, delivered the opening address and presided over the ceremonies that followed. The retiring Secretary of Health and Social Assistance, Dr. Coutinho Cavalcanti, then formally released the office to Prof. Gama, who expressed his appreciation in a brief but moving address.

"As I assume the responsibilities of the Secretary of Health and Social Assistance," he said, "I arrive at an extremely important point, not only in my own career but in opportunity to serve my fellowmen. . . . It is well known that I am inexperienced in State politics, but my organizational experience, on the other hand, has been fairly extensive. For some years I have been affiliated with medical organizations of various types; among these are the Neurological Section of the Associação Paulista de Medicina, which I served as Director and later as a member of the Council of the Departamento de Previdência. In 1945, at the Second Medical Congress of São Paulo, I was asked to serve as President of the old Society of Medicine and Surgery of São Paulo. Later, as one of the founders of the Brazilian Section of the International College of Surgeons, I was chosen as the first President of the Section; then, successively, I became General Secretary of the College of South America, First International Vice-President of the College and finally International President, which office I hold today.

Since the International College of Surgeons is the largest world-wide organization of its kind, I count this a high honor indeed. During the thirty years in which I have held office in our Charity Hospital I have seen many of my ambitions change from dream to reality.

"It is with the help of this experience that I hope to serve as Secretary of Health and Social Assistance in my native State, for it has taught me that to direct and to organize means to work with a group. Whatever the efforts made by the head of any group, they can be successful only when they are seconded by the loyal work of all direct helpers and members of the organization. I know and admire the work done by my predecessors in this office, and I know that the members of this secretariat are always willing to give their best efforts to the full discharge of its functions.

"I shall begin work immediately on the new and challenging task with which I have been entrusted and will do my utmost to acquit myself worthily."

Those who know Prof. Gama and have worked with him cannot doubt that he will not only acquit himself worthily but add new lustre to the office he assumes. In addition to the experience mentioned in his address. Prof. Gama has served as Professor of Neurology at the University of Bahia, Professor and Head of the Department of Neurology of the Medical School of São Paulo, Chief of the Neurologic Clinic of Santa Casa de Misericórdia and President of the Academy of Medicine. As a Fellow of the International College of Surgeons and now its President, he has spared no effort in his support of the causes he believes in. His colleagues will extend their warmest congratulations not only to Prof. Gama himself but to the State of São Paulo and the Governor thereof for his wise and perceptive choice of a leader so outstanding.

In order to test the idea a series of cultures in peptone water sugars without indicator was put up and varying amounts of green pigment were produced

Andrade's indicator was then added to all the glucose tubes showed a pink colour and all the other tubes remained unchanged Thus it seems clear that *Ps pyocyanea* produces a small amount of acid in glucose

Pathogenicity

Ps pyocyanea has been reported as a cause of dysenteric infections (Calmette, 1892, Lartigau, 1898, both quoted by Wilson) Wilson says that a condition resembling typhoid fever, due to infection with it, has been described by numerous workers

In these laboratories it is frequently found in routine specimens of faeces and urine sent for examination for enterica or dysentery Often it is present in pure culture in urine and from some of these cases we obtained blood for culture and agglutination (table III) In one case, 003, in which

TABLE III

Blood culture in and agglutination reactions of patients in whose urine *Ps pyocyanea* was found in pure culture

Identification number of urine specimen.	Blood culture	Agglutination reactions					
		Pyoc	TH	TO	PA	PB	X19
273	0	125	1250	250	1250	50	0
275	0	0	50	0	0	0	0
201	<i>Bact paratyphosum A</i>	125	125	1250	500	0	0
295	<i>Bact paratyphosum A</i>	250	50	1250	1250	0	0
107	0	0	250	0	0	0	0
160	0	0	125	125	0	250	0
037	0	0	0	2500	2500	0	0
043	0	0	0	0	0	0	0
003	0	250	50	0	0	0	0
003	<i>Ps pyocyanea</i>	125	0	0	0	0	0
003 2nd spec	0	50	50	125	0	0	0
289	0	no serum available					
391	0						
187	0						
194	0						
026	0						

Figures shown under "agglutination reactions" are reciprocals of the end titres

Pyoc = suspension of *Ps pyocyanea* derived from patient's own urine

TH = suspension of *Bact typhosum* containing H and O antigens

TO = suspension of *Bact typhosum* containing O antigens

PA = suspension of *Bact paratyphosum A* containing H and O antigens

PB = suspension of *Bact paratyphosum B* containing H (diphase) and O antigens

X19 = suspension of *Proteus X19 O*

the organism was recovered from the blood and the serum agglutinated it alone, it seemed that infection with *Ps pyocyanea* was the probable cause of the typhoid like fever The results with the second specimen, however, taken some ten days later, left the interpretation of this case as doubtful as that of the others in which positive agglutination reactions alone were obtained

scale. The overwhelming majority look to the doctor for hope, not challenge, and I regard it as implicit in my Hippocratic oath that I give them hope if I can and as long as I can.

The controversy has lately had a public airing outside the profession, in the publication by Random House of Lael Tucker Wertenbaker's book *Death of a Man*. Charles Wertenbaker, the author's husband, was also a professional writer, and her book is a moving human document on the humiliation and insult aforementioned. Mrs. Wertenbaker agreed with her husband that it was his inalienable right to know the nature of his illness, at any cost to either of them. Having learned that he had but a short time to live, the couple set themselves to the task of accepting the fact honestly and with as little fear as possible, and came to an equally unqualified agreement that another inalienable right of the sufferer was to suffer no longer than was compatible with what he regarded as decency.

One must grant them both the courage of their convictions. Mr. Wertenbaker endured the tyranny of body over mind for a time, but when at last he could no longer control his suffering with drugs, he slashed his wrists—with a razor handed him by his wife.

It is an impressive story—up to a point. It will make a tremendous impression, no doubt, upon that not inconsiderable portion of the public which has lately become so fond of analyzing human motives *à la psychiatrie* on every possible occasion. Its strongest appeal is to the middle ground of opinion; simpler minds than the Wertenbakers' will reject it, and so will the true intellectual as distinguished from the pseudopsychiatrist. In all justice to the author and respect for her suffering, it must be said that no reader with any humane impulses in his makeup could read it entirely without sympathy. Mrs. Wertenbaker has written it beautifully—again up to a point: the point at which journalism ceases and literature begins.

The first impression, however, does not

last. On reflection, the first thing that emerges is the fact that Mr. Wertenbaker felt in all sincerity that he could pay his wife no greater tribute than to make this inhuman demand upon her, and the next is its inescapable corollary—that if he had chosen life instead of death the demand upon her would have been infinitely greater and far less cruel.

In the passage that describes his death, Mrs. Wertenbaker says she cried out, unable to endure his suffering longer, "I love you, I love you, please die." Dramatic, unquestionably, and just as unquestionably convincing; I for one have no doubt that it is true. The fact remains that at the moment Mr. Wertenbaker was not suffering physically, and from the book's account his emotions did not go beyond relief and the satisfaction of having made what he considered a man's decision. The cynic that lurks at the back of every intelligent mind requires a firm hand to repress him at this point. To the majority of the reading public, which is amazingly healthy-minded on the whole, the essential sentimentality posing as reason and realism will not be convincing once the book is laid down.

Life and death, the two most stupendous human realities, are far too majestic to be treated as experimental material. The doctor, of all others, should know this. His experience is one man's experience multiplied a thousandfold, and the greater his perception of the meaning of that experience the more hesitant will he become to assume the prerogatives of the Almighty. He will be tempted to it all his life long; it cannot be otherwise, since he has been given prerogatives and privileges of his own that outnumber astronomically those given to others. Let him accept them, for he will need them all; but let him not imagine, because they are his, that he may usurp the mind of the Infinite, however much he feels he could improve it.

containing reagent such as Böhme's should not be used, owing to the likelihood of false positive reactions

(2) This factor probably accounts for the positive indole reactions which certain workers have reported

(3) All the strains in our series were negative for indole

(4) All formed acid in glucose

(5) Those from water could not be distinguished from those of human origin by means of the cultural characters which Bergey (1934) employs to differentiate *Ps fluorescens* from *Ps pyocyanea*

REFERENCES

- | | | |
|--------------------------------|---------|---|
| AOKI, K | 1926 | <i>Cbl Bakt</i> , Abt I, Orig, xviii 186 |
| BARDSLEY, D A | 1934 | <i>J Hyg</i> , xliii 38 |
| BERGEY, D H | 1934 | Manual of determinative bacteriology, 4th ed, London |
| EMERY ROBERTS, E | 1914 15 | this <i>Journal</i> , xix 127 |
| HADLEY, P | 1927 | <i>J Inf Dis</i> , xl 1 |
| HOLMAN, W L, AND GONZALES, F L | 1923 | <i>J Bact</i> , xiii 577 |
| TANNER, F W | 1918 | <i>J Bact</i> , iii 63 |
| TOPEL, W W C, AND WILSON, G S | 1929 | The principles of bacteriology and immunity, London, i 320 |
| TRONDISDORFF, R | 1916 | <i>Cbl Bakt</i> , Abt I Orig, lxviii 493 |
| WILSON, W J | 1929 | Medical Research Council, A system of bacteriology, London, iv 325 |

WHO'S WHO IN THE INTERNATIONAL COLLEGE OF SURGEONS

Prof. Dr. Arthur Hübner, F.I.C.S.

Professor Dr. Arthur Hübner, F.I.C.S., of West Berlin-Grünwald, Germany, was born on Aug. 29, 1887. Reaching young manhood, he studied medicine at the University of Berlin. After passing his State Board examination in 1913 he specialized in surgery. His many talents soon won him recognition; in 1927 he became a lecturer at the University, and in 1930 a Full Professor of Surgery.

Professor Hübner began his active career with an outpatient clinic of his own, where most of his work consisted of the emergency surgical treatment of accidental injuries. In 1945 he was appointed Medical Director of a municipal hospital in Berlin and retained the post with great success and esteem until 1952, since which time he has been engaged in private practice.

In addition to his central routine as a surgeon, Prof. Hübner found time and energy to serve as editor of two professional journals, *Der Chirurg* and *Monatsschrift für Unfallkunde*. He is also the author of several important books, the titles of which indicate the wide range of his interests and the versatility of his character:

Lehrbuch der Gastroskopie (A Textbook of Gastrosocopy)

Lehrbuch der Frakturen und Luxationen (A Textbook on Fractures and Luxations)

Arzthaftpflichtrecht (The Liability Law Concerning Physicians)

Notoperationen und dringende Massnahmen des praktischen Arztes (Emergency Operations and Urgent Interventions Confronting the General Practitioner).

Since 1946 Prof. Hübner has been General Secretary of the German Surgical Society.

The possessor of well-merited national and international distinction, Prof. Hübner has never for a moment lost sight of



Dr. Arthur Hüber, F.I.C.S.

the essential purpose of every Physician's and surgeon's career, the healing of injuries and diseases. Through his regular practice, his lectures, his books and his organizational activities this thread runs clear and strong. As a Fellow of the International College of Surgeons he is keenly aware of the world's great need for widely shared knowledge of surgical technic and dissemination among physicians and surgeons everywhere of all available data on research, new remedies, and modern surgical technics. He is first and foremost a surgeon, but he remains a student, both of surgery and human affairs, as is evident from his remarkable treatise on medico-legal problems. A severe critic o a ..

of animals have been repeatedly injected with either heat-killed suspensions of staphylococci or formolised filtrates from cultures of the same strain. The sera of the treated animals have been examined for antibodies and the resistance of the two groups of animals has been compared by studying the lesions produced by the injection of living staphylococci of the same strain into the skin of the treated rabbits and normal controls.

Technique

Material and methods An *aureus* strain which had been isolated from the blood of a case of acute osteomyelitis in a boy was used throughout these experiments. On plating this culture, several colony forms were noted and it was found that a white colony produced the most powerful hæmolysin for rabbit red cells. Consequently cultures of this *albus* variant were used in these experiments. Throughout this work the potency of filtrates has been estimated by titration against standard antitoxin supplied by Dr Hartley of the National Institute for Medical Research, using the hæmolytic method with rabbit cells. The antitoxin content of rabbit sera has generally been estimated as anti- α hæmolysin by titration against the *Lh* dose of filtrates standardised in this way.

Toxin production Toxic filtrates were prepared by growing the staphylococcus in an atmosphere of air containing 20-30 per cent of CO₂ on the modification of Burnet's medium recommended by Dolman (1934b). After the cultures had grown for 40 to 48 hours at 37° C, they were filtered through two layers of gauze, the filtrate was centrifuged to throw down the bacteria and the supernatant fluid filtered through Berkefeld N candles. These sterile filtrates contained a hæmolysin in such concentration that the *Lh* dose was contained in 0.05-0.2 c.c. The filtrates were actively necrotising when tested by injection into the skin of rabbits and were lethal for rabbits and mice on intravenous injection. The lethal dose of the filtrate used in expt. I when tested in mice was 0.02-0.05 c.c. and in rabbits 0.1-0.5 c.c. When estimated against standard antitoxin the amount of this filtrate corresponding to one unit of antitoxin was found to be 0.16, 0.16 and 0.2 c.c. when titrations were made by the rabbit cell hæmolysis, rabbit skin and guinea pig skin methods respectively. The filtrates, tested by Dr Valentine, were found to have a high titre of leucocidin active against human leucocytes (Valentine, 1936). No β toxin was present. Glenny and Stevens (1935) have recorded that of 38 filtrates examined by them 32 contained α toxin but no β toxin.

Preparation of toxoid Toxoid for the immunisation of rabbits was prepared from the filtrates by the addition of formalin to make the final concentration 0.4 per cent and incubation at 37° C for 3.5 days. When 0.5 c.c. of the filtrates no longer produced hæmolysis of 1.0 c.c. of 2.0 per cent rabbit red cell suspension after incubation for 1 hour at 37° C, the formolised filtrates were placed in the refrigerator at 4° C and used as required. In any one experiment the same toxoid, with or without the addition of a small amount of toxin, was used for all immunising injections.

Preparation of vaccines The bacterial sediments from the cultures used to prepare toxoid for the first two experiments were employed in making the vaccines for these experiments. The deposit of bacteria centrifuged out from the fluid obtained by filtering the whole culture through gauze was resuspended in 100 c.c. of saline containing 10 per cent broth and centrifuged again. This deposit was further washed twice with saline.

mission and to the Medical Advisory Committee of the United Mine Workers' Welfare and Retirement Fund.

He is a member of the Canton (Illinois) Rotary Club and its Past President. He also belongs to the Masons, the Shrine and the Elks. He also holds membership in the Canton Country Club, Wee Ma Tuk Hills Country Club, Creve Coeur Club of Peoria, International Club of Chicago and

the University Club of Chicago.

Dr. Coleman is co-founder of the Coleman Clinic in Canton, and President of the staff of the Graham Hospital of the same city. He was married to Gladys Huff, of Atlanta, Illinois, in 1917. Their two children are Eleanor Irene Coleman of New York City and Louise (Coleman) Scott, wife of Senator Albert Scott of Canton, Illinois.

INTERNATIONAL COLLEGE OF SURGEONS OFFERS LIFE INSURANCE PLAN

The College is offering and heartily recommending to its members throughout the world a \$10,000 group life insurance plan, to become effective when 1,500 members have registered.

Enrolling members will sign a "self-health" form. This is for the purpose of assuring the underwriters that the member is physically able to actively practice his profession and that he is free of any physical ailment serious enough to threaten the soundness of the plan.

The premiums are reasonable and may be paid annually or semiannually. The plan is underwritten by the American Life Insurance Co.

Entry into the plan will be available to those who are aged 60 or younger (an age change will be considered as occurring six months prior to the next birthday).

In the absence of Dr. Horace Turner, F.A.C.S., F.I.C.S. Chairman of the insurance Committee of the International College of Surgeons, Dr. Ross T. McIntire, F.A.C.S., F.I.C.S., Executive Director of the College, reported on the plan at a meeting of the Executive Council of the United States Section. Dr. McIntire emphasized the great advantage of the plan to Fellows abroad and to Junior Members.

The plan is, of course, entirely voluntary. "It will be administered at no cost to the College," said Dr. McIntire, "since all of the record keeping, reporting and

collection of premiums will be in the hands of an insurance firm, who have agreed to give us an indemnifying bond holding the College harmless of any possible claims arising through errors in administering the plan."

The Executive Council formally approved the plan, subject to the following stipulations:

1. That it be offered on a strictly voluntary basis.

2. That the College will not be liable in any way under the plan as adopted.

3. That the entire administration of the plan will be the responsibility of the underwriters and will involve no expense to the College.

The proposed rates and ages that form the basis of the plan are as follows:

Attained Age	Amount of Insurance	Premiums	
		Annual	Semiannual
Under 40	\$10,000	\$ 70.00	\$ 36.00
40 to 49	10,000	110.00	56.50
50 to 54	10,000	170.00	87.50
55 to 59	10,000	250.00	129.00
60 to 64 (renewal)	7,500	250.00	129.00
65 and over (renewal)	5,000	250.00	129.00

*Upon reaching the insurance age that moves him into the next higher bracket, the insured member will pay the new rate.

of animals have been repeatedly injected with either heat-killed suspensions of staphylococci or formalised filtrates from cultures of the same strain. The sera of the treated animals have been examined for antibodies and the resistance of the two groups of animals has been compared by studying the lesions produced by the injection of living staphylococci of the same strain into the skin of the treated rabbits and normal controls.

Technique

Material and methods An *aureus* strain which had been isolated from the blood of a case of acute osteomyelitis in a boy was used throughout these experiments. On plating this culture, several colony forms were noted and it was found that a white colony produced the most powerful hæmolysin for rabbit red cells. Consequently cultures of this *albus* variant were used in these experiments. Throughout this work the potency of filtrates has been estimated by titration against standard antitoxin supplied by Dr Hartley of the National Institute for Medical Research, using the hæmolytic method with rabbit cells. The antitoxin content of rabbit sera has generally been estimated as anti- α hæmolysin by titration against the *Lh* dose of filtrates standardised in this way.

Toxin production Toxic filtrates were prepared by growing the staphylococcus in an atmosphere of air containing 20-30 per cent of CO₂ on the modification of Burnet's medium recommended by Dolman (1934b). After the cultures had grown for 40 to 48 hours at 37° C, they were filtered through two layers of gauze, the filtrate was centrifuged to throw down the bacteria and the supernatant fluid filtered through Berkefeld N candles. These sterile filtrates contained a hæmolysin in such concentration that the *Lh* dose was contained in 0.05-0.2 c.c. The filtrates were actively necrotising when tested by injection into the skin of rabbits and were lethal for rabbits and mice on intravenous injection. The lethal dose of the filtrate used in expt. I when tested in mice was 0.02-0.05 c.c. and in rabbits 0.1-0.5 c.c. When estimated against standard antitoxin the amount of this filtrate corresponding to one unit of antitoxin was found to be 0.16, 0.16 and 0.2 c.c. when titrations were made by the rabbit cell hæmolysis, rabbit skin and guinea pig skin methods respectively. The filtrates, tested by Dr Valentine, were found to have a high titre of leucocidin active against human leucocytes (Valentine, 1936). No β toxin was present. Glenny and Stevens (1935) have recorded that of 38 filtrates examined by them 32 contained a toxin but no β toxin.

Preparation of toxoid Toxoid for the immunisation of rabbits was prepared from the filtrates by the addition of formalin to make the final concentration 0.4 per cent and incubation at 37° C for 3.5 days. When 0.5 c.c. of the filtrates no longer produced hæmolysis of 1.0 c.c. of 2.0 per cent rabbit red cell suspension after incubation for 1 hour at 37° C, the formalised filtrates were placed in the refrigerator at 4° C and used as required. In any one experiment the same toxoid, with or without the addition of a small amount of toxin, was used for all immunising injections.

Preparation of vaccines The bacterial sediments from the cultures used to prepare toxoid for the first two experiments were employed in making the vaccines for these experiments. The deposit of bacteria centrifuged out from the fluid obtained by filtering the whole culture through gauze was resuspended in 100 c.c. of saline containing 10 per cent broth and centrifuged again. This deposit was further washed twice with saline.



Scene in Tokyo, October 24. Left to right, Mr. Kimura, head of rug company; Prof. Dr. S. Kikuchi, F.I.C.S. Dr. H. Shiota, F.I.C.S. (Hon.), President of Japan Section, and Mrs. Kimura. Beautiful rug in background will be presented to the International Surgeon's Hall of Fame for its Japanese room. [On the occasion of the Second Around-the-World Postgraduate Surgical Clinics Trip of Members of the International College of Surgeons.]

the true Japanese spirit. This gesture on the part of so highly respected and so lovable a man was one of our most impressive experiences.

The meeting that morning was held at Tokyo University, where we saw an amazing example of Prof. S. Kimoto's brain-cooling surgical technic. The organization and teamwork Dr. Kimoto achieved while performing his difficult operation were an inspiration.

The morning was memorable also for five other operations performed at the University of Tokyo. We were then con-

ducted to the Tokyo Women's Medical College at Shinjuku, where we saw an impressive demonstration of the work of Dr. S. Sakakibara in solving some difficult problems of cardiac surgery. A full day of medical demonstrations was enjoyed by the entire party.

After the last demonstration the group returned to the hotel, and that evening all members of our party, including their wives, were entertained by a local Japanese group at a delightful dinner. After a short night's rest, we were called early next morning and taken by bus from the Imperial Hotel in Tokyo, through the



Scenes at Tokyo University. Above, a motion picture shows a cardiac operation by Prof. S. Kimoto. Below, left to right, Dr. H. Shiota, Dr. Owens and Dr. S. Kikuchi. [On the occasion of the Second Around-the-World Postgraduate Surgical Clinics Trip of Members of the International College of Surgeons.]

filtrates from which toxoid was prepared had an *Lh* dose of 0.12 c.c. Injections of vaccine or toxoid were made by the subcutaneous route at fortnightly intervals in doses of 1.0, 2.0, 2.0 and 4.0 c.c. To the last two doses of toxoid 0.1 c.c. and 0.3 c.c. of untreated filtrate were added before injection. The animals were bled for serum 11 days after the last injection of vaccine or toxoid and tested for resistance 2 days later.

Antibodies in the sera of immunised rabbits

Antitoxin. The sera of all rabbits obtained before and after immunisation were titrated for antitoxin content against filtrates which had been standardised by preliminary tests with standard antitoxin. In all these examinations hæmolysis of rabbit red cell suspension was used as an indicator so that the figures shown in table I give the content of the sera in anti- α -hæmolytin as compared with the international unit of standard antitoxin supplied by the Medical Research Council.

TABLE I

Antitoxin response in rabbits immunised with vaccine or toxoid and toxin, as determined by comparison with standard antitoxin, using the hæmolytic method with rabbit red cells

Experiment no	Rabbits immunised with vaccine				Rabbits immunised with toxoid or toxin			
	Rabbit no	Route of injection	Units of anti α hæmolytin per c.c. of serum		Rabbit no	Route of injection	Units of anti α hæmolytin per c.c. of serum	
			Before immunising	After immunising			Before immunising	After immunising
I	8	I V	<0.1	<0.1	15	I V	<0.1	3.0
	9	"	<0.1	<0.1	16	SC	<0.1	3.5
	10	"	<0.1	<0.1	17	"	<0.1	6.0
	12	"	<0.1	<0.1	19	"	<0.1	15.0
	13	"	<0.1	<0.1	20	I V	<0.1	0.6
II	73	SC	<0.1	0.3	79	SC	2.0	25.0
	76	"	0.4	0.7	80	"	<0.1	6.5
	77	"	0.9	2.0	81	"	1.0	12.0
	78	"	<0.1	0.2	82	"	<0.1	6.5
					84	"	<0.1	5.5
III	140	SC	<0.1	<0.1	145	SC	<0.1	12.0
	141	"	<0.1	<0.1	146	"	<0.1	3.0
	142	"	<0.1	<0.1	147	"	<0.1	9.0
	143	"	<0.1	<0.1	148	"	<0.1	4.0
	144	"	<0.1	<0.1	149	"	<0.1	11.0
					150	"	<0.1	9.0

I V = immunising injections given by intravenous route

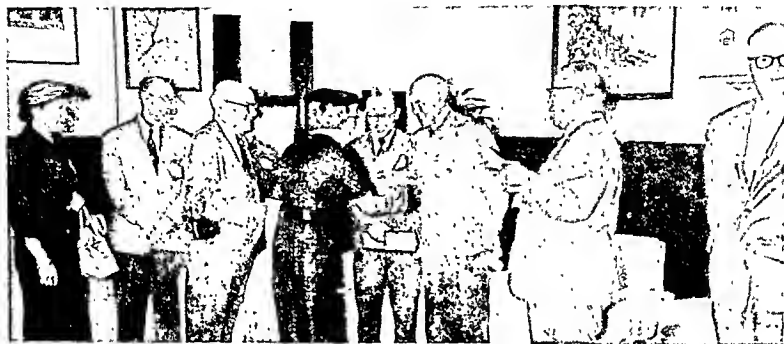
SC = immunising injections given by subcutaneous route

It will be seen from table I that except in expt II the sera of all rabbits before immunisation had less than one-tenth of a unit of antitoxin per c.c. It is apparent, however, that some of the

Kao, Ten Y. Lin, S. Y. Chiu, T. Y. Wei and Y. M. Yang represented the Clinic at the University Hospital. Also present were Dr. H. W. Lei, Dean of the Taita University College at Taipei, and General C. P. Liu, director of Medical Defense. A most interesting meeting took place at

the Taita University, where many notable papers were read by the distinguished professors of this fine University. Later, we were entertained at dinner by General C. P. Liu and Minister C. Y. Chang at the Grand Hotel.

While in Formosa we met with the



Visitors presented to General Chiang Kai-shek. [On the occasion of the Second Around-the-World Postgraduate Surgical Clinics Trip of Members of the International College of Surgeons.]



Luncheon group at Tei Pei, Formosa. [On the occasion of the Second Around-the-World Postgraduate Surgical Clinics Trip of Members of the International College of Surgeons.]

lytic doses of complement were mixed and placed in a water bath at 37° C for 1 hour, 10 c.c. amounts of 2.5 per cent sensitised sheep cells were then added and the tubes placed in the water bath for a further period of 30 minutes. The results of the precipitation tests were similar to those obtained by the complement fixation technique which, when satisfactorily controlled, gave stronger reactions with diluted antigens. The results of complement fixation tests with the sera of the animals in the first experiment obtained after immunisation are shown in table II.

TABLE II
Complement fixation tests with the sera of the immunised rabbits in experiment I

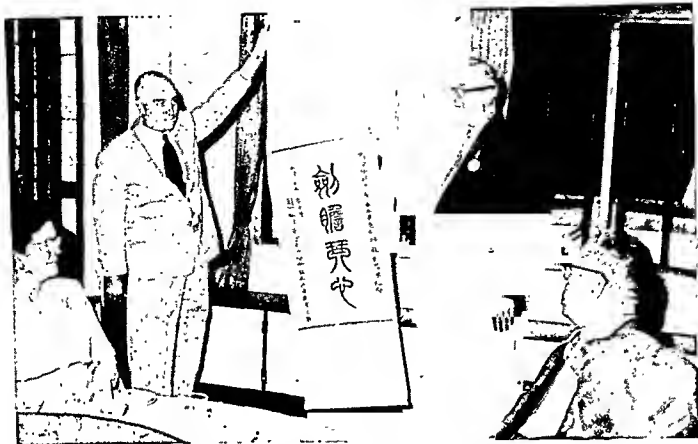
Rabbit sera (diluted 1:10)	Antigens						
	Dilutions of toxoid			Dilutions of extract of staphylococci			
	1:5	1:20	1:80	Undiluted	1:5	1:10	1:20
8	++++	++++	—	+++	++	+	
9	++++	++++	±	++++	+++	++	±
10	++++	++++	++++	++++	++++	++++	++++
12	++++	++	—	+++	++	—	
13	++++	++++	±	++++	++++	++++	++
15	++++	±	—	—	—		
16	++++	+	—	—	—		
17	++++	++++	±	—	—		
19	++++	++++	±	—	—		
20	+++	±	—	—	—		

++++ = complete fixation

— = no fixation

All sera were negative when tested with the filtrates of cultures of *Bact. coli* and the antigens gave negative results with control rabbit sera.

The results suggest that the sera of the animals which had been immunised by intravenous injection of vaccine (rabbits 8-13) and contained no antibodies to α -haemolysin, did possess antibodies to staphylococci. These antibodies were presumably responsible for the positive reactions obtained with extracts of washed staphylococci and with bacterial substances present in the toxoid. This view is supported by the results of absorption experiments made with the sera from rabbits 10 and 13. Absorption with washed staphylococci rendered the sera anticomplementary, but when the sera were absorbed with the staphylococcal extracts used in these tests they no longer gave positive reactions with toxoid. The results with the sera of the rabbits (15-20) which had been immunised by injections of toxoid may have been due to the interaction of toxoid and antitoxin, this interpretation of the results is supported by the fact that the sera which had the highest antitoxin value gave the strongest reactions. The sera of these animals gave



Presentation of scroll to Dr. Neal Owens in Hong Kong. [On the occasion of the Second Around-the-World Postgraduate Surgical Clinics Trip of Members of the International College of Surgeons.]



Visiting Fellows in the Philippines, after meeting with Dr. Quintos, Director of the Philippines General Hospital. [On the occasion of the Second Around-the-World Postgraduate Surgical Clinics Trip of Members of the International College of Surgeons.]

normal untreated rabbits, except in the case of the animals in expt II. The serum of these latter animals contained some antitoxin and the lesions produced by the injection of toxin or staphylococci showed certain of the characters of the lesions which occurred in the rabbits immunised with toxoid or toxin.

Toxin With the exception of these animals of expt II, the lesions were characterised by an area of pale necrosis of the skin, which after 24 hours frequently showed a narrow zone of reddish-purple discolouration at the margin. The lesion was flat with little evidence of reaction around the central necrotic area. The necrosis did not extend after the first 48 hours, when it measured up to 8×5 cm in extent, but remained practically unchanged in appearance until after five or six days, when the necrotic tissue began to separate. Fig 1 (T) shows the appearance of the skin of rabbit 144 one week after the injection of toxin.

Histology The chief feature of the lesions produced by toxin was the necrosis at the site of injection. This did not as a rule extend deeply and the tissues beyond the panniculus carnosus were generally unaffected. There was remarkably little cellular reaction around the necrotic area. No infiltration with polymorphonuclear leucocytes or mononuclear cells was noticeable in the early stages and even after seven days there was only slight infiltration with mononuclear cells and lymphocytes at the edge of the necrotic area.

Living staphylococci The lesions produced by the injection of staphylococci were at first similar to those produced by toxin, although the centre of the necrotic area frequently showed purplish discolouration. The lesions increased in size up to three or four days after injection, when they measured up to 10×6 cm in diameter. The edge of the lesion was usually slightly raised and purplish red in colour. An area of œdema of the subcutaneous tissues extending to the mid-line of the abdomen frequently developed during the first 48 hours. As the lesion progressed the margin became more raised and after a week the edge of the central area began to separate from the underlying tissues. Fig 1 (S) shows the lesion present after 7 days in rabbit 144. In animals allowed to survive, the necrotic tissue sloughed off, leaving an irregular ulcer with a base of white necrotic tissue which healed only after several weeks.

Histology The lesion in rabbit 140 which was killed 24 hours after injection showed extensive necrosis of the skin extending down to the panniculus carnosus. Around the necrotic tissue there was a thin layer of cells which were mostly polymorphonuclear leucocytes. The cells nearest to the necrotic tissue were markedly degenerated and showed pyknotic nuclei. Examination of the sections stained for bacteria showed that numerous staphylococci were present in the necrotic area but not in the layer of infiltrating cells, which was separated from the staphylococci by a narrow necrotic zone. Figs 2, 3 and 4 show sections of the lesions in



Visiting surgeons, headed by Dr. Owens, gather with Thailand Fellows in front of the meeting hall. [On the occasion of the Second Around-the-World Postgraduate Surgical Clinics Trip of Members of the International College of Surgeons.]

from the local University. On the following morning took a sightseeing tour of the canals of Bangkok and enjoyed the amazing sights along the floating markets.

On Monday morning we were taken to Santithum Hall for the Second Annual Meeting of the Thailand Section of the International College of Surgeons. Under the direction of Dr. Nitya Vejjavisit, President of the Thailand Section, the official cap, gown and diploma of the or-



His Excellency Premier Field Marshal P. Pibulsonggram congratulating a new member of the Thailand Section. [On the occasion of the Second Around-the-World Postgraduate Surgical Clinics Trip of Members of the International College of Surgeons.]



His Excellency Premier Field Marshal P. Pibulsonggram and Lt. Col. Nitya Vejjavisit. [On the occasion of the Second Around-the-World Postgraduate Surgical Clinics Trip of Members of the International College of Surgeons.]

ganization were bestowed upon His Excellency Premier Field Marshal P. Pibulsonggari. The Premier then conferred degrees on four local Fellows of the College, Col. Praderm Bijaphara, Dr. Charoen Bukhasuban, Dr. Romsai and Dr. Tinrat Stitnimankarn, and delivered an address.

After this ceremony, Chairman Lt. Col. Dr. Nitya Vejjavisit delivered a paper entitled "Fifty Years' Progress of Surgery in Thailand." That evening a delightful dinner was given at Dr. Sem's institution, where our group met local members and their wives.

Next day we enjoyed a sightseeing tour that included the Royal Palace and grounds, the Pantheon of Kings, the Tow-

off leaving a small ulcer. The appearance of this lesion in rabbit 150 seven days after injection is shown in fig 7 (S). Necrosis was never so extensive as in normal animals. Here also healing was slow and the raised indurated lesion persisted for two or three weeks in animals allowed to survive.

Histology Sections of the skin of 145, killed 24 hours after the test injections, showed a dense infiltration of cells, mainly polymorphonuclear leucocytes, around the site of injection. The accumulation occurred mainly between the epithelial layer of the skin and the panniculus carnosus. There was no obvious necrosis of tissue at this stage and phagocytosis of the staphylococci by the leucocytes was marked. The appearances seen in sections of the lesions in rabbits 146, 147 and 148, killed after 2, 4 and 7 days respectively, are shown in figs 8, 9 and 10. There was a small central area of necrosis in the skin after 2 days and in this area staphylococci were numerous, but there were few cells. In the dense area of cellular infiltration around the small necrotic area the majority of the cells were polymorphonuclear leucocytes and phagocytosis was a prominent feature (fig 11). Around the dense collection of infiltrating cells mononuclear cells and fibroblasts had begun to make their appearance. In sections from the rabbit killed after 4 days the inflammatory process had progressed, fibroblasts and capillaries were numerous at the periphery of the lesion, giving the appearance of early granulation tissue. The staphylococci seemed to be less numerous than after two days and the majority were contained within leucocytes. In fig 10, from rabbit 148 killed after seven days, the central part of the lesion has disappeared leaving underneath a narrow dense zone of infiltrating leucocytes and granulation tissue. In this section staphylococci were very scanty, a few being found near the surface at one or two points only. In none of these rabbits did the inflammatory process involve the deeper tissue, the lesion being confined at all stages to the tissues superficial to the panniculus carnosus.

Cultures from the lesions of immunised rabbits

Although phagocytosis of the injected staphylococci was such a prominent feature of the lesions in toxoid-immunised rabbits, cultures from these lesions yielded staphylococci in all rabbits examined up to one week after injection. When the rabbits were killed for examination the heart blood was found to be sterile in all cases.

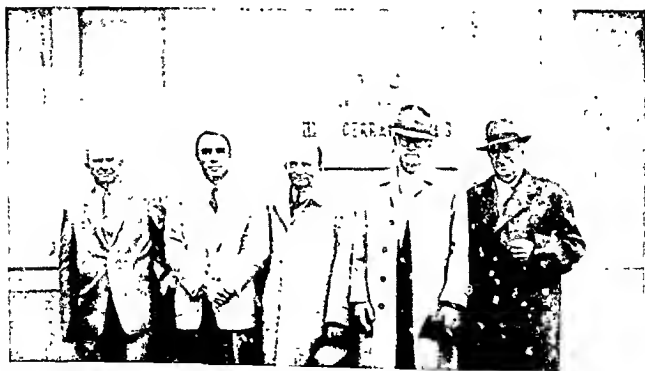
This study has served to indicate the importance of toxic substances elaborated by the cocci in the production of the changes seen in the tissues of normal rabbits and animals which had been immunised with washed heat-killed organisms. These substances apparently exert a lethal effect on the tissue cells, including leucocytes, and prevent these cells from phagocytosing the staphylococci. The progressive extension of the necrosis to the deeper tissues was apparently due to these toxins elaborated by the organisms as, in the central parts of the lesions, the zone of necrosis always extended beyond the areas where staphylococci could be found. It should be noted, however, that the lesions produced in these

during the afternoon, at which papers were presented by Dr. Kahn, Dr. Munawar Ali and Dr. Z. K. Kazi. A luncheon at the Karachi Boat Club was given in our honor by Parke Davis and Company, with Mr. and Mrs. E. V. Hopkinson as host and hostess.

The next stop was the Hotel Caravan in Teheran, Iran, where we arrived on Saturday, November 17. On Sunday, November 18, a charming dinner was proffered us at the Hotel Metropole by the Iranian Section, whose Secretary, Dr. E. Hazrati, was most helpful throughout. Here we made the acquaintance of Prof. Dr. Y. Abr, President of the Section; Dr. M. A. Sabr, President-Elect, and Dr. G. H. Mossadegh, Vice-President. Also present were General Dr. Nahjaf-Zavah, Dr. M. Tezechvan, Dr. Essamly, Dr. N. Zarrabi and Dr. N. Ameli. On Sunday, November 18, under the able management of Prof. Abl and Dr. Hazrati, an interesting program was offered by the Iranian Section in collaboration with Dr. A. V. E. Ghal, President of the University of Teheran and Minister of the Imperial Court. In connection with this meeting we also met Dr. J. H. Saleh, the Minister of Health.

We visited various surgical services and the Cancer Institute of the Pablavi University Hospital, where we watched Dr. Essamly operate for a cyst of the brain with multiple cysts of other organs. Later, at the Conference Hall of the University, we attended a scientific meeting with a series of excellent presentations. In the evening we attended a dinner given for us by the President of Teheran University, at the University Club.

Leaving Teheran with many regrets, we arrived in Istanbul Monday afternoon and were met at the airport by a group of Turkish surgeons, headed by Dr. Arel, President of the Turkish Section, and including Drs. Gurkan, Gorbon, Sezer, Nadiplju and Maniyabe. Our party was then checked into the Istanbul-Hilton Hotel, where on Tuesday we were met and called for by Dr. Arel and his associates and taken to the First Surgical Clinic of the University of Istanbul, which is the Cerrah Pasa Capital Hospital. There we saw many outstanding operations performed by Dr. Arel. Included were an operation for pericarditis, a "blue baby" procedure, cholecystectomies, operations for pyloric stenosis, etc. The clinical



Three Fellows of the College Arrangement Committee of the Turkish Section. At right, wearing hats, Dr. Neal Owens and Prof. Fabri Arel. (On the occasion of the Second Around-the-World Postgraduate Surgical Clinics Trip of Members of the International College of Surgeons.)

PLATE LXVI

- FIG 1 —Rabbit 144, immunised with vaccine Lesions 7 days after injection of toxin (T) and staphylococci (S) $\times \frac{1}{2}$
- FIG 2 —Rabbit 141, immunised with vaccine Section of lesion 2 days after injection of staphylococci H and E $\times 2$
- FIG 3 —Rabbit 143, immunised with vaccine Section of lesion 4 days after injection of staphylococci H and E $\times 2$
- FIG 4 —Rabbit 144, immunised with vaccine Section of lesion 7 days after injection of staphylococci H and E $\times 2$
- FIG 5 —Rabbit 151, normal control Section of lesion 2 days after injection of staphylococci H and E $\times 2$
- FIG 6 —High power view of lesion shown in fig 5 Clumps of staphylococci above separated from zone of leucocytic infiltration below by narrow zone of necrotic tissue with degenerated muscle Grain Weigert $\times 170$

ship of the Mayor of Istanbul.

On Friday Dr. Arel met us at 7 a.m. and accompanied us to the airport for our flight to Athens. Our flight to Greece was a very pleasant one. We arrived at 2:55 in the afternoon and were met by Prof. Louros and his associates. That evening, as guests of Prof. Louros, we went to a cocktail party at the Grand Bretagne Hotel, where we met the local surgeons and their wives. Next morning an interesting program was offered at the General Hospital, the Evangeelismos, and also at the State and University Hospital, the Alexandra. Later in the morning, at the Laicon Public Hospitals, we heard an address by the President. We saw a film on thoracic surgery, which we enjoyed tremendously.

At 1:30 a luncheon was given at the Yachting Club by the Greek Section of the International College of Surgeons for our members and their wives. The United States Ambassador and his wife were also guests. Our group then went sight-

seeing and shopping. In the evening we enjoyed a cocktail party at the home of the Secretary General of the Greek Section, Prof. Nicholas Christeas, and his charming wife.

Prof. Louros, summarizing his medical philosophy, stated: "I think Greek surgeons could give you nothing better to take back to your country than these wishes of the fathers of Medicine, which we ask you to convey with our heartfelt greetings to our colleagues and friends in the U. S. Section and, last but not least, to the great creator of our college, Prof. Max Thorek."

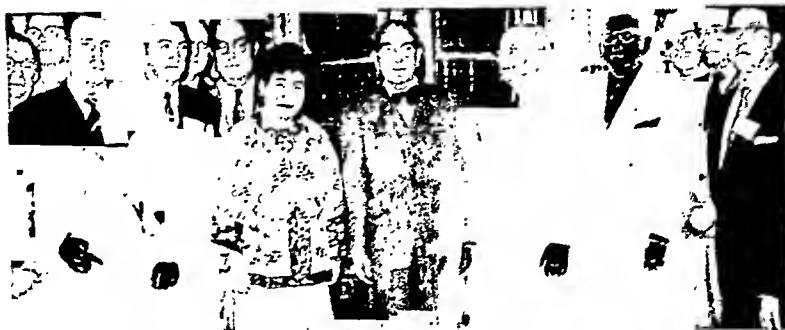
I know that I am expressing the feeling of the entire party when I say that we deeply appreciate the hospitality extended us and the heartfelt friendship that greeted us in every country we visited. It is our sincere hope that we may have the privilege and pleasure of seeing our friends in the United States in the near future, that we may have an opportunity to reciprocate their generous kindness.



His Excellency the United States Ambassador to Greece addressing the group. In the foreground, Prof. Louros and Dr. Owens. (On the occasion of the Secretariat-General's trip to Greece, the United States Trip of Members of the International College of Surgeons.)



Opening session of the Tenth International Congress.



Audience with His Excellency the President of Mexico during the Tenth International Congress.

that the scientific program was remarkable in both quality and quantity.

Another Committee also deserves high honor, namely the Reception Committee, of which Dr. Eduardo M. Morgenstern was Chairman, Dr. Mario Gonzalez Ulloa Vice-Chairman and Dr. Oscar E. Davila, Dr. Agustín Díez de Urdanivia, Dr. David Gutierrez García, Dr. H. P. de Kanter and Dr. Raul Santos Mazal assisting. More than one visiting surgeon may have felt privately that "Royal Reception Committee" would be scarcely an exaggeration, for a right royal welcome. Sharing these amenities on the feminine side was the Committee headed by Doña Gloria S. de Manzanilla, with Doña Guadalupe D. de

Chavira and Doña Maria S. de Fonseca as Vice-Chairmen, Doña Emma M. de Mora as General Secretary and Doña Gertrudis A. de Manzanilla as Auxiliary Secretary. One of the pleasantest features of all Congresses is the opportunity it affords for busy surgeons' wives to enjoy the company of their husbands and that of their friends and fellow-workers for the advancement of the profession.

Since the first day of the Congress, February 24, is Mexico's Independence Day, the visiting Surgeons, accompanied by a full Guard of Honor, proceeded to the Columna de la Independencia, Paseo de la Reforma, to lay a wreath on the national monument to Mexico's heroes of independence.

f
u
ac
b
u
nr
nc
2
ne.
yl
ff
me

an
Pa
re)
ne.

obtained before and after immunisation with vaccine had previously been compared in one rabbit and showed no appreciable difference. The serum of this animal after immunisation was compared with that of 145 which had been immunised by injections of toxoid and toxin. The same dose of organisms with varying amounts of serum was injected at six points into the skin of a normal rabbit, one flank of the animal being used for each serum.

The appearance of the lesions produced after 3 days by the mixture of staphylococci and serum 140 undiluted and diluted 1/5 and 1/25 is shown in fig. 12 at A, B and C respectively. The dose of staphylococci in each mixture was the same and the lesions are approximately equal in size irrespective of the amount of serum contained in the mixtures. All lesions were raised, with an inflamed margin and a central depressed area of necrosis. The lesions produced on the other flank of the same animal by the injection of the same doses of staphylococci and corresponding amounts of serum 145 are shown in fig. 13 at A, B and C. With the mixtures containing undiluted serum and serum diluted 1/5 a small papule only was produced at the site of inoculation. With the serum diluted 1/25 the lesion, which is not well shown at C, fig. 13, was rather larger and measured 2.3×2.2 cm. with a tiny necrotic spot in the centre.

The results of this and similar experiments made with other sera of immunised rabbits indicated that the serum of the rabbits which had been immunised with vaccine had little effect on the development of the lesions, whereas the serum of the rabbits which had been immunised with toxin or toxoid had a definite protective action as indicated by the size and severity of the lesions produced.

Discussion

The experiments described above indicate the possible role of toxic substances generated by staphylococci *in vivo* in immobilising the defensive action of the tissue cells. Whereas in rabbits which had received repeated injections of washed vaccine the lesions were similar to those in normal animals although antibodies to staphylococci could be demonstrated in the sera of some of the treated rabbits, in animals which had been immunised with filtrates of the organism the presence of antitoxin in the serum enabled the tissues to deal effectively with the living staphylococci.

This paper is not concerned with the analysis of the various antigenic substances present in the filtrates used, although the evidence available from the work of others suggests that the lysis for rabbit red cells has a lethal action on rabbit leucocytes and other tissue cells and is responsible for the lethal effect of filtrates in rabbits and mice. The relative resistance of the toxin-immunised



His Excellency Morones Prieto, F.I.C.S., Minister of Health of Mexico, receiving honorary diploma from Prof. Carlos Gama, President of the International College of Surgeons, and Prof. Manuel A. Manzanilla, Chairman of Arrangements for the Tenth International Congress.

F.I.C.S., of Philadelphia; Dr. Peter A. Rosi, F.A.C.S., F.I.C.S., of Chicago; Dr. Samuel R. Perzik, F.A.C.S., F.I.C.S., of Los Angeles; Dr. Moses Behrend, F.A.C.S., F.I.C.S., of Philadelphia; Drs. Saul Shapiro, F.I.C.S., and Daniel H. Manfredi, F.I.C.S., of New York; Dr. Sidney A. Rosenberg, F.I.C.S., of Pittsburgh; Drs. Emanuel M. Skolnik, F.A.C.S., Morris T. Friedell, F.A.C.S., F.I.C.S., Claude M. Lambert, and August F. Daro, of Chicago; Dr. James F. Dowd, F.I.C.S., of St. Louis; Dr. Salvador Castanares, of Los Angeles; Dr. Clifford L. Kiehn of Cleveland; Dr. Hebert G. Cohen, F.I.C.S., of New York; Dr. Carlos Scuderi, F.A.C.S., F.I.C.S., of Chicago; Dr. Joseph C. Risser of Los Angeles; Dr. George L. Kraft of Hollywood and Dr. Daniel H. Levinthal of Beverly Hills, California; Dr. Robert J. Kisitcheck of Los Angeles; Dr. Philip Thorek, F.A.C.S., F.I.C.S., of Chicago; Dr. Otto L. Bettag, Head of the Illinois Department of Public Health, Dr. Joseph da Silva of the State

Hospital, and Dr. Leonard Krasner, Consultant in Thoracic Surgery to the Department of Public Health, all of Chicago; Dr. James M. Ovens, F.I.C.S., of Phoenix, Arizona; Dr. Aaron N. Gorelik, F.I.C.S., of New York; Dr. Herman O. McPheeters, F.A.C.S., F.I.C.S., of Minneapolis; Dr. Arthur Dallos, F.I.C.S., of New York; Drs. Philip S. Kline and Hesiquio N. Gonzalez, of San Antonio; Dr. Philip M. Marcus of Beverly Hills, California, and Dr. Louis T. Palumbo, F.I.C.S., of Des Moines, and Dr. Juan Negrin, F.I.C.S., of New York.

Among the European participants were Prof. Dr. Claude H. Carron, Laureate of the Faculty of Medicine, Paris; Prof. Dr. Alfonso de la Fuente of the Faculty of Medicine, and Prof. Dr. Francisco Martin Lago, F.I.C.S., Madrid; Dr. T. A. Dunkersloot of Sneek, The Netherlands, and Prof. Dr. Stefano Teness and Prof. Dr. Domenico Dazzoni of Turin.



Prof. Dr. Nahor Carrillo, Dean of the National Medical University of Mexico, delivers presentation, "Abscess of the Liver."

UNITED STATES SECTION International College of Surgeons

THE PRESIDENT'S MESSAGE

Things I never knew until now—about Mexico: That the National University of Mexico, located in University City ten miles from Mexico City and the site of the recent International Congress of the College, comprises a magnificent group of buildings constructed of concrete, brick, glass and lava rock, which would command admiring attention in any city or country. That the University was founded in 1551 and is the oldest on the North American continent. That the land on which the building stands was formerly covered by a broad sheet of lava resulting from the eruption of a volcano more than five thousand years ago, which covered the villages of the oldest civilization of this area. That its medical school, which, until one year ago, was housed in the former headquarters of the Inquisition, has 6,000 students.

That Mexico is a land of monuments and murals and that one of the largest monuments in Mexico City is a fountain memorializing the ex-appropriation of the holdings of foreign oil companies.

That the hotels of Mexico have increased their rates progressively as the peso has been devaluated, yet one can still ride ten miles in a taxicab for 80 cents.

That the first domesticated animal in Mexico was the still familiar hairless dog; most of the other domesticated animals, such as horses, cattle and sheep, were brought from Spain.

That English has replaced French as an international language; in Mexico the study of English is compulsory in all schools, starting with the elementary grades.

That the building known as the Tower is not only the tallest skyscraper in Mexico City but the highest in the world—if the fact that its base is 7,500 feet above sea level is considered.



Dr. Curtice Rosser

That Chapultepec, where one sees the fabulous palace of the ill-fated Emperor Maximilian, the great Park and the present home of the President of the Republic, means *grass-hopper hill* and that there is a small stone reproduction of this insect, called in Spanish *chapulin*, decorating a

fountain in the courtyard of the castle.

That the murals of Diego Rivera, particularly those on the walls of the National Palace, continue to capture the imagination even when studied for the third time; that this artist, now 70 years old and still actively and efficiently employed, is a master in producing the illusion of the third dimension on his canvas. That the magnificent mural he painted for the dining room of the Hotel Del Prado ten years ago, entitled "A Dream of a Sunday Afternoon," contained a quotation, "God does not exist," ascribed to one of the historical characters depicted—and the hotel therefore covered the mural from public view until, one year ago, the artist himself erased the offending words.

That the itinerant vendors of shoe-shines are ubiquitous in Mexico City and that it is possible to get your shoes polished while awaiting audience with the President of the Republic in the great anteroom to his office.

That the legend of the Plumed Serpent of the Toltecs describes a god named Quetzacoatl, who was fair-haired, blue-eyed and apparently Caucasian. It is thought that he was possibly the survivor of a shipwreck on the Atlantic Coast. He was persecuted by the Toltec priests, who were jealous of his increasing popularity, finally destroyed himself by fire, first prophesy-

in the prevention or treatment of such infections, it would appear that in chronic recurrent infections of the skin occurring in individuals possessing antitoxin in the serum, other factors must be considered. The possible role of hypersensitiveness to staphylococcus in relation to recurrent infection has been indicated by Panton and Valentine (1929) and Klopstock (1935), while Dolman (1935) and Valentine (1936) have stressed the importance of the nasal carrier in repeated auto-infections. The observations in the present paper seem to indicate that in rabbits with no detectable antitoxin in their sera the injection of washed vaccines was of little value in conferring immunity against the strain of staphylococcus used. Staphylococcus vaccines prepared in the ordinary way contain a small amount of toxoid and it seems likely, as suggested by Panton and Valentine (1932) and Dolman (1935), that whatever benefit is derived from the clinical use of such vaccines may be due in part to the toxoid which they contain. Nevertheless it is not unlikely that in animals possessing antitoxin or in man the injection of vaccines as well as toxoid might serve still further to enhance the activity of the cellular defence mechanism.

Summary

1 Repeated injection of washed staphylococcal vaccines into rabbits failed to stimulate the development of antitoxin in the sera of the majority of the animals. When the vaccines had been given by the intravenous route the sera of the treated animals contained antibodies which precipitated and gave complement fixation with extracts of staphylococci. When vaccines were given by the subcutaneous route the development of such antibodies in the serum was irregular.

2 The sera of rabbits which had been immunised with culture filtrates contained antibodies to the α -haemolysin and precipitated with the filtrates, but failed to precipitate or fix complement with extracts of staphylococci.

3 The lesions produced by the injection of toxic filtrates or living staphylococci into the skin of normal and treated rabbits have been described. Rabbits which had been immunised with vaccines showed lesions similar to those in normal rabbits, whereas the lesions in the rabbits which had been immunised with culture filtrate were much less extensive and showed a more active phagocytic response on the part of the tissue cells.

4 The failure of the vaccine treatment to increase the resistance of the treated rabbits against the subsequent introduction of staphylococci into the skin has been discussed in relation to the lack of staphylococcus antitoxin in the serum of normal and vaccine-treated rabbits.

WESTERN REGIONAL MEETING AN OUTSTANDING SUCCESS

The April meeting held at the Las Vegas Hacienda, in Las Vegas, Nevada, by the Western Region of the United States Section of the International College of Surgeons, was more than well attended and will be long remembered for both the excellence of the scientific program and the great pleasure afforded by the well-planned social events.

The official program covered a number of vitally important surgical fields. Drs. Irving L. Lichtenstein, F.A.C.S., F.I.C.S., and Martin S. Levy, of Beverly Hills, California, offered a presentation on hyperthyroidism. The subject chosen by Drs. A. Bernstein, F.I.C.S., and Henry C. Bernstein, F.I.C.S., of San Francisco, was *An Historical Review of Cesarean Section*. Dr. Frank E. Polmeter, F.A.C.S., of Sherman Oaks, California, discussed the causes of imperfect results in the surgical treatment of protruding lumbar and cervical discs. Modern advancements in the treatment of common fractures were outlined by Dr. Reed S. Clegg of the University of Utah School of Medicine, Salt Lake City. Other members of the same faculty who participated were Drs. Preston J. Burnham, F.A.C.S., Thomas R. Broadbent, F.I.C.S., Mark H. Greene Jr., N. Frederick Hicken, F.A.C.S., F.I.C.S., A. James McAllister, Vernon L. Stevenson, F.A.C.S., Howard P. House, F.A.C.S., F.I.C.S., William F. House, Edward R. McKay, F.I.C.S., J. W. Mortensen, H. R. Warner, Perston J. Cutler, William Ray Rumel, F.A.C.S., L. George Veary, Robert G. Weaver, F.A.C.S., and Adolph M. Nielsen. Their topics were as follows: Dr. Burnham, *A Physiologic Treatment of Fractures in the Hand*; Dr. Broadbent, *Intra-Oral and Extra-Oral Muscles: Their Effect on the Alveolar Ridge*; Dr. Greene, *Wringer Injuries*; Drs. Hicken and McAllister, *Accidental Injuries of the Bile Ducts*; Dr. Stevenson, *Early Surgical Treatment of Acute Cholecystitis*; Drs. William F. and Howard P. House,

Stapes Mobilization for Restoration of Hearing; Dr. McKay, *Refinements in the Surgical Treatment of Fistula-in-Ano*; Drs. Mortensen and Warner, *Clinical Quantitation of Aortic Insufficiency and Aortic Stenosis*; Drs. Mortensen, Cutler, Rumel and Veary, *Management of Coarctation of the Aorta in Infancy*; Dr. Weaver, *The Surgical Treatment of the Diseased or Injured Ureter*, and Dr. Nielsen, *Mecconium Peritonitis*.

Dr. Harry Alban, F.A.C.S., F.I.C.S., of Long Beach, California, addressed the assembly on the use of ultrasonation in orthopedic practice; Dr. Edward S. LaMont, of Hollywood, on plastic surgery, both functional and cosmetics. Dr. James H. Saint, F.A.C.S., of Santa Barbara, California, spoke on acute volvulus of the cecum, and Dr. James J. Morrow, F.I.C.S., of North Hollywood, on acute pancreatitis. Dr. Lawrence Braslow, of Riverside, California, discussed closure of the duodenal stump. A plea for wider use of spinal anesthesia was presented by Dr. Elliott M. Feigenbaum of San Francisco.

From the College of Medical Evangelists, Los Angeles, were Dr. Donald C. Collins, F.A.C.S., F.I.C.S., Assistant Professor of Surgery, who spoke on the present status of histoplasmosis in the West; Dr. H. H. Edelbrock, Associate Clinical Professor of Urology, with a presentation on hypospadias, and Dr. S. L. Perzik, F.A.C.S., F.I.C.S., Associate Clinical Professor of Surgery, who discussed the place of radical neck dissection in the management of carcinoma of the head and neck.

Chemodissection: A Three-Dimensional Supplement to Surgery of the Breast was the title dealt with by Drs. Ralph L. Byron Jr., Keith H. Kelly and Howard R. Bierman, all of the City of Hope Medical Center, Duarte, California. Dr. Byron is Chief of Surgery and Director of the Hospital for Tumors and Allied Diseases; Dr. Kelly, Chief of the Section on Oncology, and Dr.

EASTERN REGIONAL MEETING TO BE HELD IN NEW HAMPSHIRE

A meeting of the Eastern Regional Division of the United States Section, International College of Surgeons, will be held at The Balsams, Dixville Notch, New Hampshire, on July 1-6, 1957.

The schedule of arrangements and the preliminary program follow:

General Chairman for Sectional Meetings
Arnold S. Jackson, M.D., F.A.C.S., F.I.C.S., D.A.B., Madison, Wisconsin

Advisory Committee on Arrangements
Moses G. Behrend, M.D., F.A.C.S., F.I.C.S. (Hon.), Philadelphia, Pennsylvania
Ralph R. Coffey, M.D., F.A.C.S., F.I.C.S., D.A.B., Kansas City, Missouri
Edward L. Compere, M.D., F.A.C.S., F.I.C.S. (Hon.), D.A.B., Chicago, Illinois
Gilbert F. Douglas, M.D., F.A.C.S., F.I.C.S., D.A.B., Birmingham, Alabama
Earl J. Halligan, M.D., F.A.C.S., F.I.C.S., Jersey City, New Jersey
Ross T. McIntire, M.D., F.A.C.S., F.I.C.S. (Hon.), D.A.B., Chicago, Illinois
Curtice Rosser, M.D., F.A.C.S., F.I.C.S., D.A.B., Dallas, Texas

General Chairman
M. Leopold Brodny, M.D., F.A.C.S., F.I.C.S., D.A.B., Boston, Massachusetts

Program Committee
General Surgery
Archibald J. Douglas, M.D., F.A.C.S., F.I.C.S., D.A.B.
Walter J. J. Nero, M.D., F.A.C.S., F.I.C.S., D.A.B.
Omar T. Pace, M.D., F.A.C.S., F.I.C.S., D.A.B.
David W. Wallwork, M.D., F.A.C.S., F.I.C.S., D.A.B.

Obstetrics and Gynecologic Surgery
Daniel Abramson, M.D., F.A.C.S., F.I.C.S., D.A.B.
Robert H. Goodwin, M.D., F.A.C.S., F.I.C.S., D.A.B.
James André Lamphier, M.D., F.A.C.S., F.I.C.S., D.A.B.
Timothy A. Lamphier, M.D., F.A.C.S., F.I.C.S., D.A.B.
William A. Lynch, M.D., F.A.C.S., F.I.C.S., D.A.B.
Philip P. McGovern, M.D., F.I.C.S., D.A.B.

Neurologic Surgery
Joseph F. Dorsey, M.D., F.A.C.S., F.I.C.S., D.A.B.

Proctologic Surgery
Gaspar Angelo, M.D., F.I.C.S., D.A.B.
John F. Keane, M.D., F.I.C.S., D.A.B.

Otorhinolaryngologic Surgery
Edward A. Abbot, M.D., F.I.C.S., D.A.B.
Byron H. Porter, M.D., F.I.C.S., D.A.B.
Oscar Rodin, M.D., F.I.C.S., D.A.B.
Samuel Segal Jr., M.D., F.I.C.S., D.A.B.
John A. Failla, M.D., F.I.C.S., D.A.B.

Orthopedic Surgery
Harry A. Berman, M.D., F.I.C.S., D.A.B.
Martin Dobelle, M.D., F.I.C.S., D.A.B.
David Goldberg, M.D., F.I.C.S., D.A.B.
Garry De N. Hough Jr., M.D., F.A.C.S., F.I.C.S., D.A.B.

Ophthalmic Surgery
Sydney S. Deutch, M.D., F.A.C.S., F.I.C.S., D.A.B.

Urologic Surgery
Howard A. Hoffman, M.D., F.A.C.S., F.I.C.S., D.A.B.
Norman L. Wilson, M.D., F.A.C.S., F.I.C.S., D.A.B.

Woman's Auxiliary
Honorary Chairmen
Mrs. Max Thorek, Chicago, Illinois
Mrs. Edwin Speidel, Providence, Rhode Island

United States Section
Chairman: Mrs. Clifton L. Dance, Brooklyn, New York
Mrs. Earl I. Carr, Lansing, Michigan
Mrs. Charles B. Kelley, Tenafly, New Jersey
Mrs. Robert LeSage, Dixon, Illinois

Local Committee
Chairman: Mrs. M. Leopold Brodny, Brookline, Massachusetts
Mrs. Henry Cabitt, Newton, Massachusetts
Mrs. Joseph F. Dorsey, Belmont, Massachusetts
Mrs. S. Charles Kasdon, Boston
Mrs. John F. Keane, Newton, Massachusetts
Mrs. George C. Robbins, Brookline, Mass.

SCIENTIFIC PROGRAM

Tuesday, July 2

Morning Session

Presiding: Howard A. Hoffman, M.D., F.A.C.S., F.I.C.S., D.A.B., New Bedford, Massachusetts
Secretary: Clarence M. Hawke, M.D., F.A.C.S., F.I.C.S., D.A.B., Harrisburg, Pennsylvania

in diameter. All tests were made on the flexor surface of the forearms. Pollen extract dilutions of 100 units per c.c. and 20,000 units per c.c. were employed for the intradermal and prick tests respectively. Carbolic acid was used for control tests in both methods. The skin reactions were examined 12 minutes after making the tests and the wheal outlines were traced in ink on albumin coated glass slides. The tracings were then copied on paper and the areas of the wheals measured by an "Allbrit" planimeter. It was found convenient to employ a fixed-focus photographic enlarger for copying the tracings on paper and to enlarge each wheal outline to $\times 3$ or $\times 5$ diameters. The enlarged tracings were then measured and the necessary reduction made. To avoid making separate readings of the area of each wheal the following device was used. The planimeter was mounted on a sheet of semi-transparent paper pinned to the drawing board, and an ink mark was made on the paper underneath the tracer point. Paper strips, each bearing the series of tracings of corresponding reactions of the whole group of patients, were inserted under the transparent paper and the sum of the areas of each series of reactions obtained by adjusting each tracing on the strip under the tracer point mark in turn. The average wheal area and the average wheal diameter were then calculated.

Treatment. This was pre-seasonal, commencing in March or April 1936 with an initial dose of from 40 to 100 units subcutaneously and increasing by 15 to 50 per cent each time to a final dose of 100,000 units at the end of May or beginning of June, when treatment ceased. All patients were "self inoculated" (Harley, 1933b) after a preliminary period of clinic treatment. Skin tests were made before starting treatment, after the 20,000 unit dose, and on completion of treatment.

Results

The results of the skin tests are set out in composite form in fig 1, they demonstrate a marked reduction in the average size of both the prick and intradermal reactions following treatment.

This reduction was quite definite in each individual case. Comparison of the reactions at the 20,000 unit dose stage of treatment with those before treatment shows a 37 per cent reduction of the average wheal diameter for the prick test and a 27 per cent reduction for the intradermal test. In all patients at this stage the prick reactions were definitely reduced, but in a number of cases the intradermal reactions were not appreciably diminished. It had been established previously that the average hay-fever patient does not exhibit any significant reduction of the prick test reactions until treatment to a dose of the order of 5000 units has been given. The present results indicate that a dose higher than this is necessary before the intradermal reactions show a significant reduction in size.

These findings are in agreement with the writer's previous conclusions that a reduction in size of the skin reactions is regularly induced by specific pollen therapy provided that sufficient dosage of potent pollen extract is administered. The matter of dosage would appear to be of major importance if the intradermal test reactions are to show a significant reduction, and this may explain

**The Newer Developments in
Orthopedic Surgery** 11:30-12:00 a.m.
Edward L. Compere, M.D., F.A.C.S., F.I.C.S.
(Hon.), D.A.B., Professor and Chairman,
Department of Orthopedic Surgery, North-
western University Medical School; Presi-
dent-Elect, United States Section, Interna-
tional College of Surgeons; Chairman,
International Section, Orthopedic Surgery,
International College of Surgeons; Secretary,
Qualification and Examination Council, In-
ternational College of Surgeons, Chicago,
Illinois

Symposium

**Management of Neck, Shoulder
and Arm Pain** 12:00-12:30 a.m.

Moderator: Edward L. Compere, M.D.,
F.A.C.S., F.I.C.S. (Hon.), D.A.B., Professor
and Chairman, Department of Orthopedic
Surgery, Northwestern University Medical
School, Chicago, Illinois

Charles Bradford, M.D., Consulting Ortho-
pedic Surgeon, Faulkner, Milton, Mt. Auburn
Hospitals and Massachusetts Hospital for
Crippled Children, Boston, Massachusetts
Joseph F. Dorsey, M.D., F.A.C.S., F.I.C.S.,
D.A.B., Instructor Neurosurgery, Tufts Uni-
versity Medical School, Boston, Massachusetts

Samuel S. Handlig, M.D., D.A.B., Instructor,
Orthopedic Surgery, Tufts University Medical
School; Instructor in Surgery, Harvard Med-
ical School, Boston, Massachusetts
Luncheon 12:30-2:00 p.m.

Afternoon Session

Presiding: George Stanley Miles, M.D.,
F.A.C.S., F.I.C.S., Somerville, Massachusetts
Secretary: George Robbins, M.D., F.I.C.S.,
Boston, Massachusetts

Hospital Architecture

**Hospital in the Round: A New Concept
in Design** 2:00-2:45 p.m.

Joseph L. Eldredge, A.I.A., Boston, Massa-
chusetts

Question Period 2:45-3:00 p.m.
"What's New" 3:00-3:10 p.m.

M. Leopold Brodny, M.D., F.A.C.S., F.I.C.S.,
D.A.B., Assistant Professor of Urology, Tufts
University Medical School; Regent of Massa-
chusetts, United States Section, International
College of Surgeons, Boston, Massachusetts

Urologic Surgery

**Arteriovenous Aneurysm
of the Kidney** 3:10-3:30 p.m.

Hamilton Fontoura, M.D., Rio de Janeiro,
Brazil; Howard A. Hoffman, M.D., F.A.C.S.,



View of The Balsams. The Switzerland of America, Dixville Notch, New Hamp-
shire, where the Eastern Division of the International College of Surgeons will
hold its annual scientific, educational and recreational meeting July 1-6, 1957.

my 3000 units per c c extract According to the writer's standard of potency the patient had been having a dose of only 6000 units The patient was treated by the writer and finally reached a dose of 100,000 units, with abolition of the skin reactions (prick test) and complete relief of hay fever

Last year, grass-pollen extracts were obtained from various commercial manufacturers and their skin-reactive potencies were tested on hay-fever patients, taking special care to select comparable skin sites for each test Very considerable variations of potency were found Fig 2 gives the reactions of a group of five hay-fever patients to the most potent and the least potent of these extracts and to two dilutions of the writer's extract

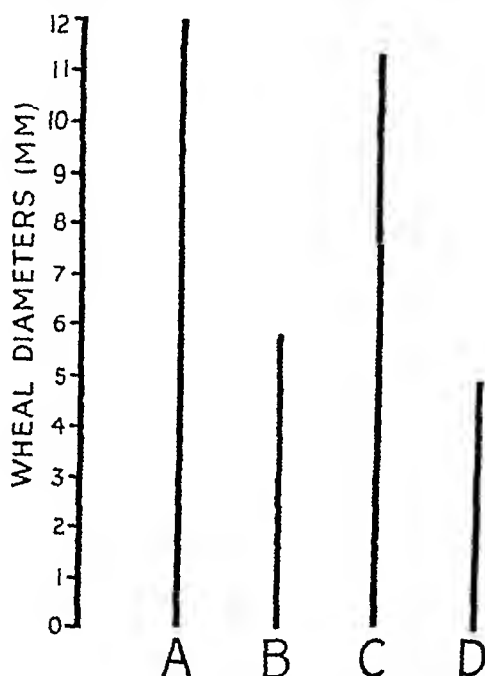


FIG 2—Skin reactive potency of grass pollen extracts obtained from different sources Average wheal diameters (prick test) in a group of 5 hay fever patients

- A Writer's extract, 50,000 units per c c
- B " " 5,000 " "
- C Manufacturer C mixed grass pollen extract, 60,000 units per c c
- D " D, " " , 50,000 " "

Sample C (mixed grass-pollen extract, 60,000 units per c c), the most potent of the series, is seen to be practically as good as the writer's 50,000 unit strength, while sample D (mixed grass-pollen extract, 50,000 units per c c) is rather weaker than the writer's 5000 unit strength extract

NEW YORK STATE SURGICAL DIVISION

The New York State Section of the International College of Surgeons anticipates a record attendance for its second meeting at Whiteface Inn, Lake Placid, New York, on May 30 and 31 and June 1. As of April 1, the Whiteface Inn at Lake Placid reports over 350 doctors registered. Since the club can accommodate 500 with facilities at a club next door, and since at least 500 can stay at the Lake Placid Club, which is also reserved for the occasion, ample space is assured. This being a busy holiday weekend, however, Dr. James P. Fleming advises early reservations.



Dr. Max Michael Simon, F.A.C.S., F.I.C.S., Regent for New York State Chapter and Co-Chairman of Program Committee.

An unusually attractive program has been planned for the ladies. Through the efforts and good offices of Mrs. James P. Fleming and the kind assistance of Dr. and Mrs. Lanpher C. Weston of Massena, New York, the following schedule has been arranged.

There will be an "arrival breakfast" on Friday at 9 a.m. This will be followed by a 21-mile trip on a modern lake steamer that accommodates 120 persons, with side trips to the "North Pole," Santa Claus Village and the animal farms, which will be of special interest to the children. There will be a trip to the top of Whiteface Mountain, from which one is able to see four states.

On Friday evening there will be a motion picture on the development of the St. Lawrence Seaway, which is now under construction. A tour of the Seaway has been arranged for Saturday.

A professional golfer will be on hand to arrange a daily golf tournament. A heated swimming pool will be available, as well as bowling in a new bowling hall and horseback riding for those who desire it.

Each evening there will be a social and cocktail hour before dinner sponsored by



Dr. James P. Fleming, F.A.C.S., F.I.C.S., Chairman.

Experimental methods

A group of twelve hay-fever (grass-pollen-sensitive) patients was investigated. These were taken from the series used for the skin test experiments reported in the preceding section, and received treatment to 100,000 units of pollen extract with subsequent reduction of cutaneous sensitivity as described therein. Serum was obtained from each patient before (serum A) and after (serum P) treatment. In general, the passive transfer methods used by Cooke *et al* (1935) were employed, viz the intradermal injection of mixtures of serum A and of serum P with pollen extract and with saline in normal non-allergic test subjects susceptible to passive transfer, observation of the ensuing reactions, and the reinjection of each skin site with grass-pollen extract 24 hours later.

RESULTS

1 *The reactions of serum-pollen mixtures in non-allergic test subjects*

Technique Each set of test mixtures was made up as follows

No	Equal volumes
1	Serum A + pollen extract (200 units per c c)
2	„ + saline
3	Serum P + pollen extract (200 units per c c)
4	„ + saline

The mixtures were placed in the ice chest. The following morning 0.1 c c of each mixture was injected intradermally in a non-allergic test subject, mixture 1 proximally, mixture 2 distally, in one forearm, and mixtures 3 and 4 likewise in the other arm. After an interval of 45 minutes the reactions were recorded. Next day the mixture sites were reinjected with 0.025 c c of pollen extract (2000 units per c c) and the reactions recorded 12 minutes later.

Comparison of the reactions of the serum A- and serum P-saline mixture sites to pollen extract (figs 3 and 4) showed that no marked reduction of the sensitising power of the serum had occurred as the result of the treatment. It has been reported previously (Harley, 1933b) that a reduction of sensitising power is obtained only if massive dose treatment is continued after the skin reactions are abolished. In the present cases the skin sensitivity was markedly reduced but not abolished. All serum A-pollen mixtures gave rise to reactions which reached their maximum in about 45 minutes. This is in agreement with the

Woman's Auxiliary

PRESIDENT'S MESSAGE

Getting Acquainted



Mrs. Clifton L. Dance

Our page in the March-April *Bulletin* was planned to acquaint the members with their officers and various committees. In this issue I should like to introduce your Regional Vice-Presidents.

In a sense, the Regional Vice-President in your section of the

country is your particular representative, and she can best serve her Section and you if you make yourself known to her. For instance, permit me to quote from an excellent report made by Mrs. V. T. DeVault on the Regional Meeting held at the famous Greenbrier Hotel in White Sulphur Springs, West Virginia. Mrs. DeVault is one of the Regional Vice-Presidents for the Mid-Atlantic Section, and she represented the Woman's Auxiliary at this meeting. She writes:

"Surgeons' wives from the Gulf of Mexico to the Great Lakes and from the Atlantic Ocean to west of the Mississippi River came together, renewed old friendships and made new ones. The General Chairman for the Woman's Auxiliary was Mrs. Elbyrne Gill, who, with her co-chairmen, Miss Jean Gill, Mrs. Francis McGovern, Mrs. Charles Easley, Jr., Mrs. J. G. Jantz, Mrs. Andrew F. Giesen, Mrs. Edgar W. Weaver and Mrs. George Bourne welcomed the ladies who attended (about 100) and arranged for them to enjoy the events that had been planned.

"A tour through this fabulous hotel delighted both the homemakers and the party-givers among us; from the stainless steel kitchens, so efficiently run, to the wing where President Eisenhower met the

Canadian Prime Minister. For those who liked bridge and canasta, events were arranged with prizes for each table. Many availed themselves of the curative baths and massages, while the out-of-doors ladies had walks, golf and auto trips to nearby points of interest. The shopper is always with us, and the lovely Greenbrier shops were a delight. Some of our more studious women attended the doctors' lectures. The Auxiliary will be happy to learn that we have gained new members from this fine group."

We are most grateful to Mrs. DeVault, for her report shows that the Regional meetings are a golden opportunity for surgeons to combine a few days of change and rest with the continuous study imposed by their dedicated profession. For our women, these meetings are also far more than a vacation at a delightful hostelry. We meet other women toward whom we feel a collective kinship, a warmth and satisfaction that enrich these particular holidays, because we know that our husbands also find a rewarding satisfaction in these "get-togethers" and discussions with their colleagues.

The Regional Meetings bring the College to you, wherever you are located. There are no "remote Sections." The State Regents of the College have been planning these meetings in such charming and historically interesting places that the location itself becomes an added attraction. By the time this article sees print, the next Regional Meeting (April 7-10, 1957) of the Great Lakes Division and the Indiana State Section will have taken place. Dr. Andrew Bowen, Regent for Kentucky, has scheduled this meeting at another magnificent hotel, the French Lick Sheraton, French Lick, Indiana. California State Chapter will h at

that the addition of serum from normal non-sensitive individuals was without such inhibiting effect

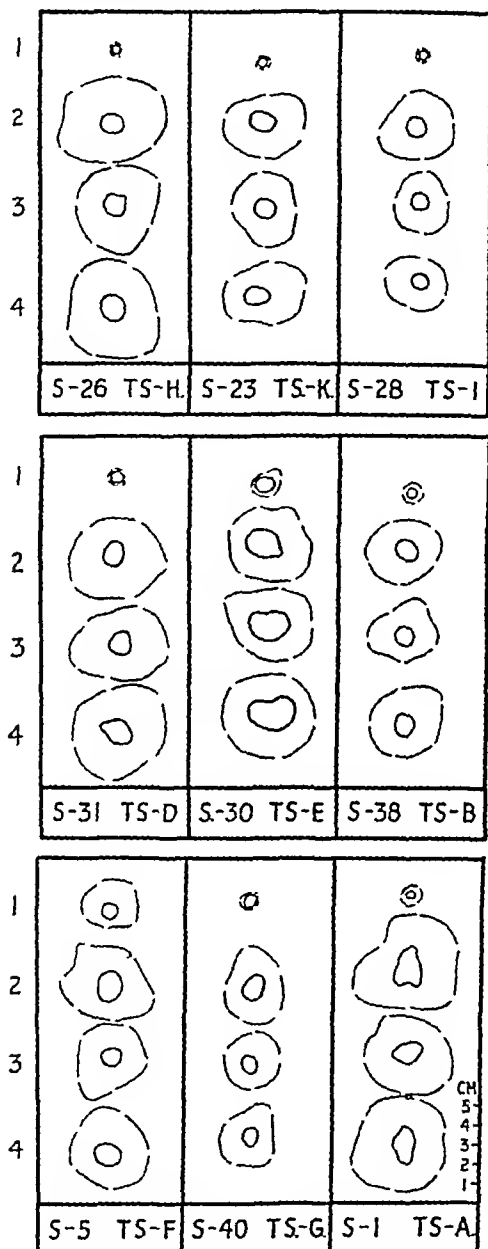


FIG. 4.—Reactions of serum pollen mixture sites to pollen extract 24 hours after the mixtures were injected

- | | |
|----------------------------|----------------------------|
| 1 Serum A + pollen extract | 3 Serum P + pollen extract |
| 2 „ + saline | 4 „ + saline |
| S = Serum of patient no — | TS = Normal test subject |

The foregoing results are in close agreement with those obtained by Cooke *et al* (1935) in ragweed-sensitive cases and they

COSTA RICA SECTION

At a recent meeting of the Costa Rica Section of the International College of Surgeons, the following officers were elected for 1957-1958:

- Dr. Oscar Pacheco Chaverri, President
- Dr. Marino Urpí Rodríguez, Vice President

- Dr. Edwin R. Zamora Segura, Dr. Alejandro González Luján, Dr. Esteban A. Lopez Varela, Members of the Board of Trustees
- Dr. Manuel Alvarez Iraeta, Treasurer
- Dr. José María Ortiz Céspedes, Secretary.

FINNISH SECTION

The annual meeting of the Finnish Section of the International College of Surgeons was held in Helsinki on Feb. 8, 1957. The meeting was opened by Prof. Väinö Seiro, F.I.C.S., and the following new officers were elected:

Prof. Dr. A. R. Klossner, F.I.C.S., Professor of Surgery at the University of Turku, President

Prof. Dr. Paavo Vara, F.I.C.S., Professor of Obstetrics and Gynecology, University of Helsinki, Vice President

Dr. O. Peräsalo, F.I.C.S., Lecturer in Surgery at the University of Helsinki, Secretary

Dr. Lauri Aro, F.I.C.S., Lecturer in Anesthesiology at the University of Helsinki, Treasurer.

The new President, Prof. Klossner, thanked the meeting for the trust placed in him. He proposed a vote of thanks to

the Past President, Prof. Väinö, for his work. The meeting recommended to the Head Section that the names of new members be submitted for their approval.

The following papers were read: by Prof. Dr. K. R. Inberg, "Complete Rectal Prolapse," and by Dr. Harry E. Blomqvist, "Acute Perforations of the Stomach and Duodenum." Dr. C. von Numers described his studies of the Early Diagnosis of Carcinoma of the Uterine Cervix.

The Annual Report (which was presented) showed that within the year Prof. Väinö had been nominated an honorary Fellow of the International College of Surgeons. At the meeting on Oct. 13, Dr. M. J. Karvonen, a guest, had read a paper on experiments made on the Function of the Lungs. Dr. M. Sulamaa had surveyed the possibilities of the treatment of Hermaphrodites. The Annual Meeting was followed by a banquet.

FRENCH SECTION

The next Congress of the French Section of the International College of Surgeons will be held at Reims on May 23-26, 1957, under the leadership of Dr. J. Bouvier, President of the Section.

There will be a permanent secretary at the Cercle Colbert, 4, rue Noël, near the railway station, where registration may be

effected between 9 a.m. and 8 p.m., at which time there will be a dinner meeting at Cercle Colbert. A brief address on the history of Reims will be given by Prof. J. Bouvier, with transparencies showing the city and its monuments. Projections and talk on the famous stained-glass windows of the Reims Cathedral will be offered :

the reactions recorded in 45 minutes and the sites reinjected with pollen extract 24 hours later

The results (fig 6) demonstrated that the reaction-inhibiting effect produced in serum A-pollen mixtures by the addition of serum P was dependent on the addition being made some time before the mixtures were injected, in which case they behaved as serum P-pollen mixtures, producing no reactions on injection but leaving the sites reactive to pollen 24 hours later. On the other hand, the serum A-pollen-serum P mixtures which were put up immediately before injection gave rise to reactions similar to those

	REACTIONS TO		REACTIONS TO		REACTIONS TO	
	MIXTURES	POLLEN EXT 24 HRS LATER	MIXTURES	POLLEN EXT 24 HRS LATER	MIXTURES	POLLEN EXT 24 HRS LATER
1						
2						
3						
4						
5						
	SERUM A-24 SERUM P-25	TS-A	SERUM A-23 SERUM P-2	TS-D	SERUM A-33 SERUM P-5	TS-O

Fig 6—Reactions of normal skin sites to (A) serum A pollen serum P mixtures, and (B) pollen extract 24 hours later

- | | | |
|---|--------------------|---------------------------------------|
| 1 | Serum A + saline | } Prepared 24 hours before injection |
| 2 | " + pollen extract | |
| 3 | " + " " + serum P | |
| 4 | " + " " + " | |
| 5 | Serum P + saline | Prepared immediately before injection |
| | | Prepared 24 hours before injection |

of serum A-pollen mixtures and the reinjection of the sites with pollen 24 hours later produced reactions similar to those of serum P-pollen mixture sites, the latter due presumably to the idioceptor of serum P that had escaped inactivation at the time the mixtures were injected

These experiments have suggested that the reaction-inhibiting effect was the result of an action of the RIS on the idioceptor which prevented the latter from uniting with idiotoxin but which did not prevent its attachment to the skin cells

Fig 7 gives a diagrammatic representation of the reactions discussed above

the Esophagus

Dr. Barbin, Nantes: *Permanent Intubation in Inoperable Carcinoma of the Esophagus*

Dr. Bouvier, Reims: "Good" and "Bad" Gastrectomies

At 12:30, luncheon will be served in the Pommeroy Caves or ad libitum.

At 2 p.m. Dr. Jerome J. Moses, of Chicago, will present *Problems in Hepatobiliary Disorders*.

After another visit to the exhibits at 4 p.m., followed at 6 p.m. by a visit to the Saint-Remi Basilica and the Cathedral, dinner will be served at the Pommeroy Caves at 8:30.

For Sunday, May 26, three different programs have been arranged, according to the desires of the participants.

1. Religious Services

At the Cathedral: 8:30, 10, 11:45

At the Temple: 10:30

2. 9-11 a.m.: Scientific Papers

Visit to the Regional Center of Malignancies, conducted by Prof. LeFèvre, Director

3. Visit to the Center of Thoracic Surgery at Châlons; scientific session by Dr. Monod

Transportation will be provided.

Other Communications

Endoscopic Films

Prof. Raymond Darget, Bordeaux: *Radium*

Therapy of Malignant Tumors of the Urinary Bladder

1. Tumors Limited to the Bladder

2. Infiltrating Tumors

Prof. DeCoulx, Lille: *Fractures of the Calcaneus*

Surgery of the Genitourinary Organs

Prof. Darget and Dr. De Castelmur, Bordeaux: *An Experimental Study in Ureteral Plastics by Means of Arterial Homografts*

Dr. LeCocq, Clermont-Ferrand: *Evaluation of the Danger of Hemorrhage and Thrombo-Embolisms During Prostatectomy*

Dr. Van Keerbergen, Brussels: *Discussion of Ureteral Plastics*

Dr. Dufour, Paris: *Ureteral Plastics Endocrinology, Biology, Cancerology*

Dr. Brenier: *Problems in the Surgery of Malignant Disease*

Prof. Darget and Dr. Lämarche, Bordeaux: *Irradiation of the Hilum of the Prostate with Radioactive Isotopes in Cancer of the Prostate*

Prof. Despons, Bordeaux, and Dr. R. Gauducheau, Nantes: *Lympho-Epithelioma of the Tonsil (Projections)*

Medical films will be shown without interruption during the congress, in a special room.

NETHERLANDS SECTION

The first refresher course in Anesthesiology offered in the Netherlands was held in January 1957 at Boerhaave-kwartier, Leyden, under the direction of Dr. L. A. Boere, F.I.C.S. A comprehensive program of instruction was given, dealing with anesthesiology in all its main aspects: its use in cardiac surgery, its relation to hypotension in general and plastic surgery, its effect upon the respiratory tract. Hypothermia was fully discussed; its induction, its biochemical aspects, its postoperative phase and its physiologic effect.

On the final day of the course a number of excellent clinical and laboratory demonstrations were given in the fields of anatomy, physiology, pathology, hemodynamics and defibrillation.

Assisting Dr. Boere as leaders of the course were Prof. Dr. A. G. Brom, Prof. Dr. J. Mulder and Prof. Dr. H. A. Snellen. Participants in the scientific program were Dr. Sheila Anderson (London), Dr. L. A. Boere, Dr. F. H. Bonjer, Dr. B. Bink, Prof. Dr. A. G. Brom, Ir. J. Bekink (Arnhem), Prof. Dr. R. Brinkman (Groningen), Prof. Dr. J. Dankmeijer, Mej. A. Dekker, W. Dekker, Dr. G. E. H. Enderby (London), Dr. W. R. O. Goslings, Dr. J. F. Ph. Hers, H. Labadie (Den Haag), Dr. A. E. Loeliger, Prof. Dr. J. Mulder, Dr. Muller Fz., Dr. J. Niekerk (Amsterdam), Prof. Dr. N. G. M. Orie (Groningen), Dr. J. D. Robertson (Edinburgh), Prof. Dr. H. A. Snellen, H. G. Verdonk, J. Th. Ch. Vonk and Dr. Voorhoeve (Rotterdam).

some time at least, the union of idiotoxin with the idioceptor after the attachment of the latter to the skin cells. It is suggested, therefore, more as a working hypothesis for future research, that the R I S is a derivative of the idiotoxin, a kind of inactivated idiotoxin left over from the reaction with the sensitive tissues of the hay-fever patient, which retains some measure of immunological specificity but is no longer capable of inducing the allergic reaction.

The second problem is the part taken by the R I S in the process of therapeutic desensitisation. Earlier in this communication the evidence in favour of specific desensitisation (inactivation of idioceptor, fixed and circulating) was presented. It would now appear probable that both take part in the process and that the specific desensitisation effect is enhanced temporarily by the action of the R I S. This would account satisfactorily for the partial return of skin sensitivity observed frequently a few weeks after pollen therapy is stopped. A crucial point in support of the R I S hypothesis would be the demonstration of reduction of local skin sensitivity in the untreated hay-fever subject following the intradermal injection of a serum P. The experiment was carried out in one case and the reaction of the treated site was found to be smaller than that of control untreated sites.

SUMMARY

1 A group of 40 hay-fever (grass-pollen-sensitive) patients was treated with grass-pollen extract to a final dose of 100,000 units. Prick and intradermal tests were performed before, during, and after treatment.

2 The prick and intradermal test reactions were both markedly reduced in size following this treatment. The prick test reactions showed a reduction greater than that of the intradermal reactions at the 20,000 unit dose stage of treatment.

3 A number of commercial grass-pollen extracts were tested for skin-reactive potency and very considerable variations were found.

4 It is concluded that pollen therapy results in a decrease in size of the specific skin reactions provided a sufficient dosage of potent pollen extract is administered.

5 A reaction-inhibiting substance (R I S) makes its appearance in the serum of patients sensitive to grass pollen after treatment with grass pollen. This substance blocks or inhibits the reactions of normal skin sites to serum-pollen mixtures.

6 The block occurs, not between the skin cells and the idioceptor (allergic reagin), but between the latter and the idiotoxin (allergen).

7 The R I S apparently acts by attaching itself to the idioceptor, so preventing idiotoxin from uniting with the idioceptor.

IN MEMORIAM

SAMUEL E. C. MOORE, M.B., M.D., F.R.C.S. (C), F.I.A.A., F.I.C.S.

Dr. Samuel Ernest Cunningham Moore of Regina, Saskatchewan, Canada, died on October 4, 1956, after a heart attack. In his passing, the Saskatchewan profession has lost a veteran member whose contribution made him a leader in medicine and whose personal qualities have endeared him to all his colleagues. Born in Collingwood, Ontario, in 1882, Dr. Moore received his public and high school education in the schools of Wiarton and Chesley, Ontario. He graduated from the University of Toronto in 1908 with the degree of Bachelor of Medicine, later obtaining the degree of Doctor of Medicine.

After two years of post-graduate study in surgery at Fordham University Hospital and Bellevue Hospital in New York City and Moses Taylor Hospital in Scranton, Pennsylvania, he established his practice in Regina in 1910.



Dr. Samuel E. C. Moore

A skilled surgeon, Dr. Moore served on the medical staffs of the Regina General and Grey Nuns Hospital and delivered over three thousand lectures to their respective schools of nursing over a period of forty-five years. His community activities included membership in the Rotary Club of Regina as well as leadership in Red Cross activities for crippled children. He represented the profession as a member of the Executive Committee of the Canadian Medical Association in 1926-27.

Dr. Moore was widely known for his work in the founding of the Royal College of Physicians and Surgeons of Canada and was a charter Fellow of this. He was

also instrumental in the founding of the Canadian Hospital Association. In 1952 he was honored by elevation to the status of Senior Member in the Canadian Medical Association, and in 1953 he received a Fellowship in the International College of Surgeons during the Eighteenth Congress of the College in New York City.

Vigorous and outspoken, Dr. Moore retained his youthful enthusiasm for all good works. As a Fellow of the International College of Surgeons, his dedication to surgery and to the College ideals was equalled by the amazing energy and clear insight he brought to bear upon our activities and our problems. He will be sorely missed, not only by the community he served so well but by all the colleagues who knew and appreciated his quality.



FOUNDED BY DR. MAX THOREK

The Journal of the International College of Surgeons

FOUNDED IN GENEVA, SWITZERLAND, 1935 - INCORPORATED IN WASHINGTON, D. C., 1940

Vol. XXVII

JUNE, 1957

No. 6

General Surgery

Practical Observations of the Biliary Tract with Operative Cholangiography and Cholografin

MAURICE D. SACHS, M.D., D.A.B.*

CLEVELAND, OHIO

THIS article is offered in emphasis of what can be accomplished with operative cholangiographic study and the intravenous Cholografin.

Operative cholangiographic investigation is invaluable not only in the detection of calculi but in differentiation between pancreatitis and neoplasm, non-calculus obstruction, such as fibrosis of the

sphincter of Oddi, and avoidance of unnecessary surgical intervention. Further, it permits a sound anatomic orientation in secondary operations.

In this technic, as in all new procedures, time and patience are needed to become expert. In addition, there is need for teamwork between the surgeon, the roentgenologist, the technician, the surgical nurse and the anesthetist. Just as more than one or two gastrectomies are needed to qualify a surgeon, so a procedure should not be judged until it has been tried repeatedly to eliminate shortcomings. In most instances these shortcomings are due to lack of experience. The extra time re-

*From the Department of Radiology, Cleveland V. A. Hospital, and Western Reserve University School of Medicine, Cleveland, Ohio.

*Chief, Radiology Service, V. A. Hospital, Cleveland, Ohio; Associate Professor of Radiology, Western Reserve University School of Medicine.

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.

Submitted for publication Sept. 23, 1956.

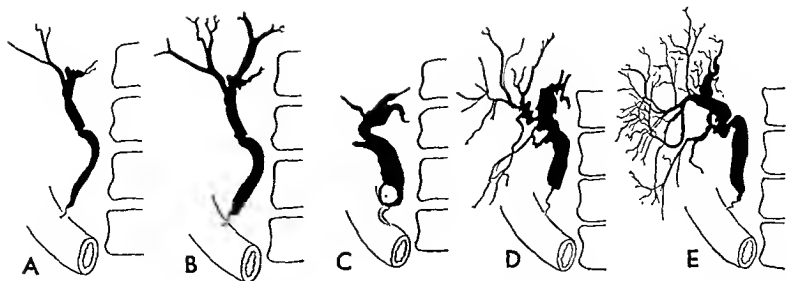


Fig. 1.—Dysfunction of sphincter of Oddi. A, transitory spasm; B, prolonged spasm; C, stone with associated spasm; D, inflammation with proximal dilatation; E, fibrosis.

mon duct occluded by large calculi (rare), and (5) spasm and sometimes false passages due to instrumentation in the common duct. (Spasm may be prevented by using magnesium sulfate before control operative cholangiograms are taken.)

Dysfunctions of the Sphincter of Oddi.—These may be classified as follows (Fig. 1): (1) transitory spasm (dyskinesia); (2) prolonged spasm (dyssynergia); (3) hypertrophy; (4) inflammation, and (5) fibrosis. This classification is a loose one, for in the majority of patients these conditions may overlap.

With transitory spasm the sphincter of Oddi segment is narrow, but there is no proximal dilatation of the common duct. With prolonged spasm the proximal portion of the common duct is slightly dilated. With persistent spasm there is stagnation of bile with the eventual formation of calculi. Hypertrophy and inflammation may then ensue. Up to this stage, the process is reversible if the cause can be removed. If not, the end result is fibrosis, with proximal dilatation of the common duct and the gallbladder.

Cholangiographic Evidence of Pancreatitis.—In 85 per cent of all patients the middle segment of the common duct traverses the posterior head of the pancreas

or proceeds in a groove. Involvement of the head of the pancreas and its effect on the common duct (Fig. 2) may therefore be classified as follows: (1) lateral displacement on the middle portion of the common duct; (2) angulation between the proximal and middle segments of the common duct; (3) Proximal dilatation of the common duct, obstructive reflux of the contrast medium into the intrahepatic ducts, with eventual formation of calculi, and (4) compression of the middle portion of the common duct.

These abnormalities are observed most often during operative or intravenous cholangiographic study. If the roentgenologist maintains a high index of suspicion even during an oral study, however, a gallbladder at the upper limits of normal that fails to respond to a fat meal and is associated with proximal dilatation of the common duct should warrant further study with Cholografin.

Cholografin.—Since the introduction of Cholografin several years ago there has been a renewed interest in roentgen visualization of the biliary tract. This may have led to its injudicious use. The oral cholecystogram method is not infrequently supplanted by the Cholografin method.

responsible for the Wassermann reaction resides in the ether soluble acetone insoluble (phosphatide) fraction of such extracts (Browning, 1924). Recently Fischer and Günsberger (1935, 1936) have described experiments in which an "antigen" active in the Wassermann reaction was obtained from heart muscle previously extracted with chloroform and regarded as practically lipid free. They conclude that the specifically reacting substance in the usual preparations is adsorbed on to the contained lipid. These authors have shown, however, that for complement fixation this substance requires to be reinforced with lecithin or inactive material derived from the chloroform extract. The question has therefore been opened up whether the active substance is a true phosphatide or some other associated body. It has been evident from earlier work (see Browning) that lecithin from different sources may vary greatly in activity: thus lecithin from heart muscle, liver, etc., has proved active whereas lecithin from brain and egg-yolk has been inactive. Walker (1916-17) demonstrated the activity of alcoholic extracts of certain vegetable substances.

The augmentation of the Wassermann reaction by ethyl alcohol and by cholesterol was emphasised by Browning and his collaborators (Browning, 1924), and it was shown at a later date by Mackie and Finkelstein (1928-29) that these substances *per se* yielded a minor degree of complement fixation with normal animal sera, this effect being analogous in certain respects to the reactions obtained with the Wassermann antigen. Other chemically and physically diverse substances also yielded similar though weak reactions.

These observations all suggested that the Wassermann reaction, with the associated precipitation, is not a serological phenomenon *au generis* but possibly bears some relationship to reactions manifested by the serum of normal animals with various chemical substances among which certain lipids are outstanding. Though it might seem difficult to understand how reactions with some of these substances could have any relationship to the functions of antibodies, nevertheless close analogies were elicited between the behaviour of the reactive principle in the serum and that of certain recognised natural antibodies.

Recently in the course of observations with lipid fractions separated from certain bacteria and tested with immune sera, well marked precipitation (or flocculation) phenomena were encountered. These were found to be non-specific and obtainable with normal sera. It was decided to study them further in their relationship to the syphilis reaction and the previously observed reactions with normal animal sera and the Wassermann antigen. The inquiry was also extended to the examination of different types of lipids from various sources.

By a suitable technique stable suspensions of most of these products have been obtained. With many of them complement fixation tests were impracticable owing to excessive anti-complementary or haemolytic action and the observations were therefore limited to the precipitation phenomenon.

It was observed at the outset that cholesterolisation of these lipid products greatly augmented the visible precipitation obtained with serum and often stabilised the saline suspension prepared from them. It was also found that colloidal suspensions of cholesterol



Fig. 3.—Calculi of common duct (Cholografin). A, distal portion of duct obscured by opaque medium in duodenum. Diameter of common duct is normal. B, laminogram showing several distinct calculi in distal portion of duct. C, operative cholangiogram confirming presence of calculi. Note difference here in diameter of common duct from appearance in intravenous and operative studies.

graphic effect is *ipso facto* an indication of damage to the liver. This is not true. The pyelographic appearance is encountered fairly frequently with no clinical or laboratory evidence of hepatic disease.

Side reactions to Cholografin are less than those observed during an intravenous urographic examination. Reactions can be controlled by a regular slow rate of injection with a stop-watch used as control. The rate should not exceed 5 cc. per minute; if 40 cc. is used, the injection should not be prolonged beyond eight to ten minutes. Of 333 patients examined with the double dose (40 cc.), 30 complained of mild nausea, 21 of nausea and vomiting and 13 of urticaria. Two hundred of this group had undergone cholecystectomy.

Cholografin is demonstrable in the biliary radicles within ten to fifteen minutes after its injection. Obviously, it is impractical to attempt routine visualization of the ductal system and gallbladder every 10 to 15 minutes for two or three hours.

It should be determined in advance,

therefore, whether the emphasis is to be placed on the intrahepatic and common ducts, which are visible with fifteen minutes, with a maximum concentration in the common duct at thirty to forty-five minutes, or on the gallbladder, which appears as an area of thin veil-like density at forty-five minutes with maximum concentration at two to two and one-half hours.

Some pitfalls encountered in interpretation with Cholografin are: (1) stratification of the gallbladder due to failure of bile and dye to mix, with the result that bizarre shadows may be mistakenly interpreted as calculi; (2) air bubbles in the biliary tract after sphincterotomy, misinterpreted as stones; (3) ability of a gallbladder to function, after sphincterotomy; (4) Cholografin in the duodenal bulb or the descending portion of the duodenum, mistaken for a cystic stump; (5) calculi in the distal region of the common duct, obscured by rapid emptying of Cholografin into the duodenum (Fig. 3), and, (6) persistence of

responsible for the Wassermann reaction resides in the ether soluble acetone insoluble (phosphatido) fraction of such extracts (Browning, 1924). Recently Fischer and Günsberger (1935, 1936) have described experiments in which an "antigen" active in the Wassermann reaction was obtained from heart muscle previously extracted with chloroform and regarded as practically lipid free. They conclude that the specifically reacting substance in the usual preparations is adsorbed on to the contained lipid. These authors have shown, however, that for complement fixation this substance requires to be reinforced with lecithin or inactive material derived from the chloroform extract. The question has therefore been opened up whether the active substance is a true phosphatide or some other associated body. It has been evident from earlier work (see Browning) that lecithin from different sources may vary greatly in activity: thus lecithin from heart muscle, liver, etc., has proved active whereas lecithin from brain and egg yolk has been inactive. Walker (1916-17) demonstrated the activity of alcoholic extracts of certain vegetable substances.

The augmentation of the Wassermann reaction by ethyl alcohol and by cholesterol was emphasised by Browning and his collaborators (Browning, 1924), and it was shown at a later date by Mackie and Finkelstein (1928-29) that these substances *per se* yielded a minor degree of complement fixation with normal animal sera, this effect being analogous in certain respects to the reactions obtained with the Wassermann antigen. Other chemically and physically diverse substances also yielded similar though weak reactions.

These observations all suggested that the Wassermann reaction, with the associated precipitation, is not a serological phenomenon *suu generis* but possibly bears some relationship to reactions manifested by the serum of normal animals with various chemical substances among which certain lipids are outstanding. Though it might seem difficult to understand how reactions with some of these substances could have any relationship to the functions of antibodies, nevertheless close analogies were elicited between the behaviour of the reactive principle in the serum and that of certain recognised natural antibodies.

Recently in the course of observations with lipid fractions separated from certain bacteria and tested with immune sera, well marked precipitation (or flocculation) phenomena were encountered. These were found to be non-specific and obtainable with normal sera. It was decided to study them further in their relationship to the syphilis reaction and the previously observed reactions with normal animal sera and the Wassermann antigen. The inquiry was also extended to the examination of different types of lipids from various sources.

By a suitable technique stable suspensions of most of these products have been obtained. With many of them complement fixation tests were impracticable owing to excessive anti-complementary or hæmolytic action and the observations were therefore limited to the precipitation phenomenon.

It was observed at the outset that cholesterolisation of these lipid products greatly augmented the visible precipitation obtained with serum and often stabilised the saline suspension prepared from them. It was also found that colloidal suspensions of cholesterol



Fig. 4.—Normal measurements of common duct. *A*, film taken before fat meal. Gallbladder slightly contracted; diameter of common duct, 5 mm. *B*, film taken after fat meal. Gallbladder slightly contracted; diameter of common duct, 3 mm. *C*, operative cholangiogram; diameter of common duct, 5 mm. Distortion of common duct caused by catheter.

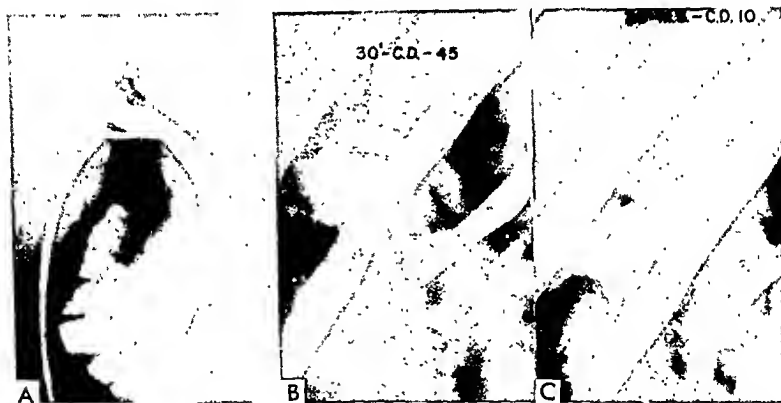


Fig. 5.—Measurements of common duct. *A*, operative cholangiogram taken in April 1953. Diameter of common duct is 10 mm. Note angulation caused by catheter. *B*, film taken with Cholografin (thirty minutes); diameter of common duct, 4.5 cm. *C*, film taken after administration of morphine sulfate (after twenty additional minutes); diameter of common duct, 10 mm. Compensatory dilatation is not present.

weeks to ten years. A detailed report, prepared in collaboration with surgical and medical associates, is nearing completion.

Owing to the prolonged action (several hours) of morphine, this drug should not be administered immediately prior to a

Cholografin study, particularly if there is any question of dysfunction. An abnormal condition is created which could make it difficult to differentiate spasm from fibrosis. In a normal common duct after administration of morphine, constriction of the sphincter of Oddi seg-

overnight at room temperature and usually became more pronounced after 48 hours at room temperature. The control tubes (lipoid suspension without serum) showed no precipitate. It is noteworthy that precipitation was produced by normal sera in high dilutions. The reaction in the higher zone was in this respect quite unlike that obtained with syphilitic serum or normal animal serum along with the lipoid products generally used for the syphilis flocculation test.

This bacterial lipoid was then compared with (1) a standard antigen as used for the syphilis test (cholesterolised alcoholic extract of sheep's heart) and (2) a cholesterolised egg lecithin preparation. In view of the known thermolability (above 60° C) of the principle in serum responsible for the syphilis reaction and the corresponding reaction of normal animals (Mackie and Watson, 1926), comparative tests were made with specimens of normal rabbit serum, unheated, and heated for 30 minutes at 55, 60, 65 and 70° C respectively. (The specimens heated at 60° or over had previously been diluted with saline to obviate coagulation.) The results (table I) show that while the heart extract yielded only a single zone reaction (fourfold dilutions 1-2), the bacterial extract showed the double zone effect. In both cases the reactions were maximal after heating the serum at 55° C and progressive weakening occurred at higher temperatures, with practically complete inactivation at 70° C. On the other hand heating above 60° C brought about progressive reactivity with the egg lecithin in the serum dilution range 4-6 (6 representing the highest dilution tested with this product). These results revealed three types of reaction. *A*, corresponding quantitatively to the syphilis reaction, i.e. occurring in dilutions 1-3 but not higher, maximal in tube 1, and progressively weakened by heating the serum above 60° C, *B*, occurring in the dilution range 4-8 and also progressively weakened by heating the serum above 60° C, *C*, occurring in the dilution range 4-6 (or higher) but only activated by heating the serum above 60° C. The *A* type of reaction occurred with the heart extract and the bacterial lipoid but not with egg lecithin. The *B* reaction was produced only by the bacterial extract. The *C* reaction in this experiment occurred only with the egg lecithin.

Later tests with egg lecithin and various animal sera, in which the full extent of the *C* reaction and the influence of still higher temperatures were determined, showed that its usual range was from dilutions 2-10 and that precipitation was maximal after heating at 75°-90° C (tables II-VIII). The sensitivity of this lipoid to exceedingly minute amounts of heated serum was remarkable.

On extending the tests it was found that these precipitation reactions were characteristic results of the interaction of normal serum of various animals and lipoids from different sources.

Se describe el diagnóstico colangiográfico de malfuncionamiento del esfínter de Oddi (espasmo ó fibrosis) y pancreatitis.

Se enfatiza el valor práctico de un examen con cholografín, especialmente después de colecistectomía.

Se discute en detalle el diámetro del colédoco normal y el del colédoco después de la operación.

ZUSAMMENFASSUNG

Der Bedarf für operative cholangiographische Untersuchungen und deren praktische routinemässige Ausführung werden erörtert.

Praktisch wichtige Punkte in der Deutung der Röntgenbilder werden hervorgehoben.

Die cholangiographische Diagnose der fehlerhaften Funktion des Sphincter Oddi (von Krampfstörungen bis zur Fibrose) und der Bauchspeicheldrüsenentzündung wird umrissen.

Der Wert der Untersuchung mit Cholografín besonders nach Gallenblasenresektion wird betont.

Auf die Erörterung des Durchmessers des normalen Choledochus und desselben nach Operation wird besonders eingegangen.

SUMARIO

Discute a necessidade a execução prática da colangiografia operatória. Os aspectos praticos de interpretação radiográfica são ressaltados. O diagnóstico colangiográfico da disfunção do esfínter de Oddi (do espasmo à fibrose) e a pancreatite são motivo de explanação. O A. salienta o valor pratico da Colangiografia com Cholografín especialmente após a colecistectomia. O diámetro do coledoco antes e depois da operação merecem comentarios especiais.

BIBLIOGRAPHY

- F. F. and Sachs, M.D.: Routine Use of Cholangiography. Surg., Gynec. & Obstetrics, 106: 1-10, 1958.
- Sachs, M. D.: Cholangiography (Cholangiography). New York: McGraw-Hill, 1958.
- Sachs, M. D.: Cholangiography: Refresher Course. Read at the Fifty-Fourth Annual Meeting of the American Roentgen Ray Society, Cincinnati, Sept. 24, 1958.
- Sachs, M. D.: Visualization of the Common Duct During Cholecystography; Its Significance, Am. J. Roentgenol., Rad. Therapy and Nuclear Med. 69:745-766, 1958.
- Sachs, M. D., and Partington, P. F.: Routine Operative and Postoperative Cholangiography. Refresher Course. Read at the Fifty-Fourth Annual Meeting of American Roentgen Ray Society, Washington, D. C., Sept. 21 & 22, 1954.
- Sachs, M. D.: Some Advantages of Operative Cholangiography (Editorial), Arch. Surg. 72:530-532, 1956.
- Sachs, M. D., and Partington, P. F.: Cholangiographic Diagnosis of Pancreatitis, Am. J. Roentgenol., Rad. Therapy and Nuclear Med. 76:32-39, 1956.

I have found that, with some natures, it would pain and perplex their moral anatomy to move direct to an object. Like snakes, they seem formed to take pleasure in indirect motion; with them the true line of moral beauty is a curve.

—Vauvenargues

In the series of tests with horse serum illustrated in table II, a wide-range reaction occurred with serum heated at 55° C and bacterial extract III, the maximum being in dilutions 4 and 5, and the serum was practically inactive at 65° C. This was interpreted as the *B* reaction, the *A* effect being absent or weak. The *C* reaction occurred after heating the serum at 75 and 85° C and in this case there was a continuous maximal reaction ranging over dilutions 6-10, no end point being reached. In view of later observations with this lipoid it seems likely that this was due to a merging of the *C* reaction with another type of reaction occurring in a still higher zone. With the other bacterial extract (IV) the *B*

TABLE II

Precipitation reactions of normal horse serum with various lipoids

	Series of quadrupling dilutions of sera from 1-4										
	1	2	3	4	5	6	7	8	9	10	Control
Lipoid B diphtheriae (III)											
Serum heated at 55° C	1	3	3	1	4	2	1	0	0	0	0
" " " 65° C	1	0	0	0	0	0	0	0	0	0	
" " " 75° C	0	0	2	3	3	4	4	4	3	3	
" " " 85° C	0	0	1	2	3	4	4	4	4	4	
Lipoid B diphtheriae (IV)											
Serum heated at 55° C	0	0	1	4	4	2	0	0	0	0	0
" " " 65° C	0	0	0	0	0	1	0	0	0	0	
" " " 75° C	0	0	0	2	4	4	4	4	2	0	
" " " 85° C	0	0	0	2	4	4	4	1	0	0	
Egg lecithin											
Serum heated at 55° C	0	0	0	0	0	0	0	0	0	0	0
" " " 65° C	0	0	0	3	3	3	0	0	0	0	
" " " 75° C	0	0	1	4	1	4	4	4	4	2	
" " " 85° C	0	0	1	3	4	4	4	3	2	1	
Heart extract											
Serum heated at 55, 65, 75, 85° C	Negative in all dilutions										

Readings after 48 hours

reaction was more restricted in range and the same applied to the *C* effect. The reaction with egg lecithin (*C* type) occurred over a wide range of dilutions and activation commenced at a lower temperature (65° C) than with the bacterial lipoids. It will be seen that this serum gave no reaction with the heart extract. Thus with all preparations the serum lacked the property of producing the *A* reaction.

The results shown in table III (rabbit serum) again illustrate the double zone reactions (*A* and *B*) clearly separated. The *C* reaction was evident at 75 and 90° C, but a further double zone effect was observable at the higher temperature with one of the lipoid preparations (III), maxima occurring in dilutions 4-6 and

gressively downhill. A nasogastric (Levine) tube connected to a Wangenstein suction machine was inserted, and the patient was treated for shock. He was placed in an oxygen tent. While his blood was being typed and cross-matched, electrolytes, Levophed, and blood plasma were administered intravenously to restore blood volume and maintain blood pressure.

About two and one-half hours after admission the patient vomited 1,000 cc. of bright red blood. He complained of thirst and cramping in both legs. The blood pressure, in millimeters of mercury, immediately dropped to 55 systolic and 30 diastolic, and the abdomen became much softer. In spite of blood transfusion under pressure, however, the blood pressure continued to decline until, about an hour and a half after the episode of hematemesis, it could be no longer determined.

In addition to the fact that the patient continued to vomit blood at intervals, another 2,500 cc. of bloody fluid was removed from the stomach by Wangenstein suction.

The blood transfusions and other antishock measures were continued until the patient was pronounced dead about eleven hours after the initiation of treatment.

Autopsy was performed by Dr. Silik H. Polayes, Director of Pathology at Cumberland Hospital. The significant observations were as follows:

Cavities.—Fibrous adhesions were present between the peritoneal surface of the ileum and the parietal layer of the peritoneum.

Heart.—The myocardium showed scattered hemorrhagic areas. Subendocardial hemorrhagic extravasation was present.

Respiratory System.—The trachea and bronchi were filled with bloody fluid. The lower lobes of the lungs contained atelectatic areas and areas of intra-alveolar hemorrhagic extravasation.

Gastrointestinal System.—The stomach was dilated and filled with bloody fluid. There was an intact gastrojejunal anastomosis. The mucosa was slightly thickened and congested. The peritoneal surface of the small intestine showed scat-

tered hemorrhagic areas. The wall was edematous, and the lumen was filled with bloody fluid. *Microscopic examinations* of the small intestine revealed walls thickened by fibrosis. The submucosal veins were dilated. There was marked hemorrhagic extravasation through the submucosa and other layers of the wall.

In summary, the *postmortem diagnosis* was massive gastrointestinal hemorrhage due to rupture of multiple varicosities of the veins (phlebectasia) of the small intestine.

COMMENT

Multiple phlebectasia of the small intestine are uncommon. No statistics have been published on the incidence of this condition. If we accept Kaijser's³ inclusion of "phlebectasia" and "hemangioma" under the same heading, however, some estimate as to its frequency can be arrived at as follows:

Hansen⁴ pointed out that hemangioma (all forms) represents about 6 per cent of all benign tumors of the small intestine. Furthermore, in his autopsy figures, Raiford⁵ noted a ratio of 9 benign neoplasms of the small bowel per 10,000 autopsies; Buckstein,⁶ an incidence of 16 per 10,000; and Shandalow,⁷ an incidence of 83 per 10,000. By a simple arithmetical process one can calculate that the incidence of multiple phlebectasia of the small intestine can be variously estimated at between 1 in 18,000 and 1 in 2,000 cases.

These are not impressive figures. They emphasize the importance of recognizing the common causes of gastrointestinal bleeding—gastric or duodenal ulcers (benign or malignant), eroded esophageal varices, gastric polyps, acute gastritis, small intestinal neoplasms and the like. Nevertheless, when it is possible either clinically, radiographically or by exploratory laparotomy to exclude the aforemen-

Table V shows results with normal human serum, reactivity with heart extract being completely negative. On the other hand *A* reactions occurred with the two bacterial extracts though not with the vegetable lecithin. The double zone effects with the bacterial extracts were evident but in both cases the *A* and *B* reactions were merged. The egg and vegetable lecithins gave *C* type reactions. With egg lecithin activation occurred at 65° C ,

TABLE V

Precipitation reactions of normal human serum with various lipoids

	Series of quadrupling dilutions of sera from 1 4										
	1	2	3	4	5	6	7	8	9	10	Control
Lipoid <i>B. diphtheriae</i> (IV)											
Serum heated at 55° C	4	2	4	4	1	0	0	0	0	0	0
" " " 65° C	0	0	0	0	0	0	0	0	0	0	
" " " 75° C	0	0	0	0	2	4	3	0	0		
" " " 90° C	0	0	3	4	4	2	0	0	0		
Lipoid <i>B. diphtheriae</i> (VI)											
Serum heated at 55° C	3	2	4	1	0	0	0	0	0	0	0
" " " 65° C	0	0	0	0	0	0	0	0	0		
" " " 75° C	0	0	3	2	2	1	0	0	0		
" " " 90° C	0	3	3	2	1	0	0	0	0		
Egg lecithin											
Serum heated at 55° C	0	0	0	0	0	0	0	0	0	0	0
" " " 65° C	0	0	0	0	3	4	2	1	0		
" " " 75° C	0	0	0	0	4	1	1	0	0		
" " " 90° C	0	1	3	4	4	3	0	0	0		
Vegetable lecithin											
Serum heated at 55° C	} Negative all dilutions										0
" " " 65° C											
" " " 75° C											
" " " 90° C	0	3	2	0	0	0	0	0	0		
Heart extract											
Serum heated at 55° C	} Negative all dilutions										0
" " " 65° C											
" " " 75° C											
" " " 90° C											

Readings after 48 hours

with the vegetable lecithin activity of the sera was noted only after heating at 90° C. A peculiar shift in the zone of these reactions was noted when the serum was heated at the higher temperatures.

Table VI illustrates results with pigeon serum, which was usually found to lack the *C* factor—an exceptional result as compared with other sera—though *A* and *B* effects were well marked. With the lipoid of *B. diphtheriae* (III) the full range of the precipitation was probably due to merging of the *A* and *B* reactions.

Frog's serum (table VII) was exceptional in the absence of the

orchiectomy and not to depend on biopsy examination, for fear of spreading cancer cells if this were a malignant tumor. The testicle was removed, with care taken to ligate the cord high up in the inguinal canal. The post-operative course was uneventful.

When examined on Dec. 28, 1956, the patient was in good health; there had been no recurrence.

The pathologic report by Dr. Nathan Rudo revealed the following:

Gross: The specimen consisted of the left testicle, epididymis and part of the spermatic cord enclosed in the tunica vaginalis. It weighed 35 Gm. and measured 5 by 4 by 3 cm. Within the superior portion of the testicle was a firm nodule 1.8 cm. in diameter. On section, the nodule consisted of white laminated caseous material with a peripheral bounding capsule attached at one area to the tunica albuginea. The adjacent testicular tissue appeared normal, and no abnormalities were seen in the rest of the specimen (Fig. 1).

Microscopic: The capsule of the nodule was composed of a thin layer of stratified squamous epithelium resting on a base of fibrous connective tissue. The epithelial cells were flattened and the superficial cells contain keratohyalin granules. Laminated keratin masses rested on the epithelium in the form of thin wavy sheets. No accessory skin structures or teratomatous elements such as cartilage, teeth or glands were found. The testicular tubules showed a moderate degree of spermatogenic activity. There was an increased number of interstitial cells (Fig. 2).

The diagnosis was epidermoid inclusion cyst of the testicle.

Careful routine examination of all men entering the Armed Services, since World War II, has revealed that benign cyst of the testicle may not be quite so rare as formerly believed. Though they may be painful, many of these cysts are asymptomatic and in private practice are usually detected during routine examination or in cases of trauma or acute inflammation of the testicle. Cystic disease may be congenital or may occur after birth. Albert, Frater, and others found a number of these cysts while performing routine autopsies.

When a differential diagnosis is being

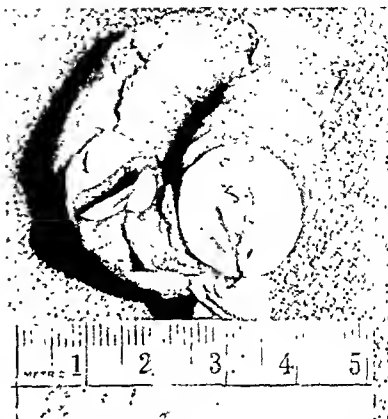


Fig. 1.—Sagittal section of testicle, showing epidermoid inclusion cyst arising from inner surface of its substance, close to tunica albuginea ($\times 1.2$).

made, the presence of a painless, slow-growing, firm, round or ovoid mass in the testicle should lead the physician to suspect benign cyst. The neoplastic tumor grows much faster than the latter type. It should not be confused with encysted hydrocele of the body of the testis, which usually transmits light. Cysts of the tunica albuginea are apt to be smaller, may be multiple, and are situated nearer the periphery of the testis, completely invested with the tunica albuginea. Microscopic study is necessary in order to distinguish these from simple cysts of the substance of the testis.

Gonadotrophic hormone determination is valuable in the diagnosis of many types of neoplastic growths, such as adenocarcinoma, chorio-epithelioma, and certain kinds of seminoma, especially when there is metastasis. However, it is of no use in cystic disease of the testicle, as there is no increase in gonadotrophic hormones nor in certain types of malignant neoplasm, i.e., seminoma without lymphoid stroma (Stevens).

C reaction occurring as an exceptional result at 55° C. By comparison with the results produced by the bacterial extract (which do not include the *B* reaction) it seems likely that the latter explanation is the correct one. It will be shown later how the absence of the *C* effect is due to a thermolabile inhibitory factor in the serum.

It was pointed out by Mackie and Watson that the serum of young rabbits, 3 to 8 weeks old, lacks the power of reacting with the Wassermann antigen in the complement fixation and flocculation tests, but develops these properties later. The same absence of reactivity in young animals has been noted in relation to certain natural antibodies (Mackie and Finkelstein, 1928-29, 1930, 1931, Gibson, 1930). To ascertain whether a similar lack of reactivity exists towards the various lipoids under investigation, tests were carried out with two litters of young rabbits 15 and 26 days old respectively. The blood specimens from each animal in the litter were pooled and treated as one sample. In both cases the *A* reaction was absent with all the lipoids tested, the specimen from one litter failed to give the *C* reaction with the bacterial lipoids though reacting weakly with egg lecithin (table VIII). The effect with extract III was interpreted as a *B* reaction. It will be noted that all the reactions were relatively weak as compared with those of adult animals (*cf* previous tables).

TABLE VIII

Precipitation reactions with pooled serum from litter of young rabbits (15 days old) and various lipoids

	Series of quadrupling dilutions of serum from 1-4								
	1	2	3	4	5	6	7 10	Control	
Heart extract Serum heated at 55° C	Negative all dilutions								0
Lipoid <i>B. diphtheriae</i> (III) Serum heated at 55° C	1	2	2	1	0	0	0	0	
" " " 90° C	Negative all dilutions								
Lipoid <i>B. diphtheriae</i> (IV) Serum heated at 55° C	0	0	3	2	0	0	0	0	
" " " 90° C	Negative all dilutions								
Lipoid <i>B. diphtheriae</i> (VI) Serum heated at 55° C	0	0	2	0	0	0	0	0	
" " " 90° C	Negative all dilutions								
Egg lecithin Serum heated at 90° C	0	1	1	3	3	1	0	0	
Vegetable lecithin Serum heated at 55° C	} Negative all dilutions								
" " " 90° C									

Readings after 48 hours

veal chronic inflammatory processes as characterized by round cell infiltration and fibroblastic proliferation of tissues. In addition, careful study should be made of the vas deferens, epididymis, opposite testicle, prostate, and seminal vesicles.

COMMENT

Epidermoid or inclusion cysts include ectodermal elements without evidence of endoderm or mesoderm.

It is highly probable that various etiologic factors contribute to the formation of benign cysts of the testicle. In some instances they are congenital, while in others trauma or infection may be the predisposing mechanism.

In my patient it was difficult to determine the cause of the cyst. The fact that the patient did not have it at the age of sixteen rules out a congenital anomaly. Chronic pyelonephritis and cystitis were present yet the pathologic examination revealed no evidence of preexisting infection of the involved testicle.

SUMMARY

A case is reported of asymptomatic, benign epidermoid cyst of the left testicle in a man aged 25, which was relieved by orchietomy.

Recent careful routine physical examinations have revealed that benign cysts of the testicle may not be quite so rare as they were formerly considered. They comprise less than 5 per cent of all testicular tumors.

The presence of a painless, slow-growing, firm round mass in the testis should make one suspect a benign cyst.

The accepted treatment is orchietomy, although in exceptional instances local excision can be performed. All testicular tumors should be regarded as potentially malignant. In case of the slightest doubt orchietomy should be performed, as it is preferable to remove the testicle for a

benign lesion than to disseminate malignant cells.

The cause of benign cyst has yet to be satisfactorily determined, in spite of the many hypotheses that have been presented. It is highly probable that various etiologic factors contribute to its formation.

ZUSAMMENFASSUNG

Es wird über den Fall einer symptomlos verlaufenden epidermoiden gutartigen Zyste im linken Hoden eines 25jährigen Mannes berichtet, der mit Resektion des Hodens behandelt wurde.

Neuerdings haben sorgfältige routinemässige Körperuntersuchungen ergeben, dass gutartige Zysten des Hodens wohl nicht so selten vorkommen, wie bisher angenommen wurde. Sie bilden etwa fünf Prozent aller Hodengeschwülste.

Das Bestehen einer schmerzlosen langsam wachsenden festen Geschwulst im Hoden sollte den Verdacht auf eine gutartige Zyste erwecken.

Die anerkannte Form der Behandlung besteht in der Resektion des Hodens, obgleich in Ausnahmefällen auch eine örtliche Resektion durchgeführt werden kann. Alle Hodengeschwülste müssen als potentielle bösartige Erkrankungen angesehen werden. Wenn auch nur der leiseste Zweifel besteht, sollte eine Hodenresektion ausgeführt werden, weil es besser ist, einen Hoden wegen einer gutartigen Erkrankung zu entfernen, als die Ausbreitung bösartiger Zellen zu riskieren.

Trotz der zahlreichen entwickelten Hypothesen gibt es noch keine befriedigende Erklärung der Ursache gutartiger Hodenzysten. Wahrscheinlich spielen bei ihrer Entstehung verschiedene ätiologische Faktoren mit.

SUMARIO

Um caso de cisto epidemóide do testículo esquerdo, assintomático, num homem de 25

was capable of producing all types of reaction when tested with an appropriate range of lipoids, negative results as regards particular effects were not infrequently observed with an individual specimen. A separate factor in serum for each type of reaction was therefore postulated.

From the results in table IX it will be seen that there was no definite correlation between the *A* reaction with the heart extract and any of the reactions with other lipoids except the *A* reaction with the vegetable lecithin. This applied to both animal and human sera. Among the latter, while the heart extract and the vegetable lecithin differentiated, by the presence or absence of the *A* effect, between syphilitic and normal sera, no such difference was obtained with the bacterial lipoids. The bacterial lipoids, be it noted, were obtained by acetone extraction and were mainly acetone-soluble whereas the heart extract and the vegetable lecithin represented acetone-insoluble products. It appeared from these results that the *A* factor of the vegetable lipoid was similar to that of the heart extract and that both differed from the *A* factors of the other preparations. It may be noted that a vegetable lipoid has been reported as active in the Wassermann reaction (*vide supra*).

The question also arose whether the *A* factors of the bacterial lipoids were identical and similarly the *C* factors of these and the egg and vegetable lecithins. The results might seem to indicate differences particularly as regards the *C* factor of the bacterial lipoids and the egg and vegetable lecithins, but in assessing differences varying sensitivity of the lipoid must be taken into account. Thus quantitative differences in this respect might with certain sera bring about what appear to be qualitative differences.

From these collective observations it was possible to characterise the four types of precipitation reaction as follows.

A reaction. This was limited to dilutions 1-3 of the series, the maximum being usually in dilution 1 though occasionally in 2 or both, it was progressively inactivated by heating the serum at temperatures over 60° C (30 minutes) and was usually completely annulled at 70° C. The syphilis flocculation reaction with an ether-soluble acetone-insoluble lipoid could be definitely classified as this type, but, as has been shown, acetone-soluble lipoids yielded a similar effect uncorrelated with the syphilis reaction. For descriptive purposes we have designated the reaction which can be so correlated *A*₁, the uncorrelated effect *A*₂, and the postulated factors in the lipoid and serum concerned in these effects by the same symbols. Both *A*₁ and *A*₂ serum factors were absent from young animals of the species investigated (rabbit). While the *A*₁ factor was absent from normal human serum, *A*₂ was frequently present. From the results obtained it seems possible that various normal animals possess *A*₁ and *A*₂ factors in their serum, though

RÉSUMÉ

Il s'agit d'un cas asymptomatique de kyste épidermoïde bénin du testicule gauche chez un homme de 25 ans, guéri par orchietomie.

Il ressort de recherches systématiques récentes que le kyste testiculaire bénin est moins rare qu'on le pense (5% de toutes les tumeurs des testicules). Il faut y songer lorsqu'on se trouve en présence d'une masse tumorale ferme, à croissance lente.

Traitement: orchietomie; dans des cas exceptionnel on pourra se contenter d'une excision locale.

Les tumeurs des testicules devraient toujours être suspectées de malignité. L'orchietomie est indiquée lorsqu'il y a le moindre doute, car il est préférable de pratiquer l'ablation d'un testicule dissémination de cellules malignes.

Nous en sommes encore aux hypothèses quant à l'origine des kystes bènins des testicules; il est probable que divers facteurs étiologiques entrent en ligne de compte.

BIBLIOGRAPHY

Albert, E.: *Traité de chirurgie clinique et de médecine opératoire*. Paris: G. Steinheil, 1893.

Arcadi, J. A.: *Cysts of tunica albuginea testis*. J. Urol. 68:631, 1952.

Barach, A. L.: Report of a case of cyst of the

testicle in a dog. Proc. New York Path. Soc. 19: 38, 1919.

Bland-Sutton, J.: *Tumours innocent and malignant*. London: Cassell, 1922.

Cook, F. E., Jr., and Kimbrough, J. C.: Epidermoid cysts of the testicle. J. Urol. 72:2-236, 1954.

Cooper, A.: *Observations on the structure and diseases of the testis*. Ed. 2. Philadelphia: Lea & Blanchard, 1845.

Curling, T. B.: *Observations on cystic disease of the testicle*. Med.-Chir. Trans. London 36: 22-449, 1853.

Dockerty, M. D., and Priestley, J. T.: Dermoid Cysts. J. Urol. 48:392, 1942.

Ewing, J.: *Teratoma testis and its derivatives*, Surg. Gynec. & Obst. 12:230, 1911.

Frater, K.: *Cysts of the tunica albuginea (cysts of the testis)*. J. Urol. 21:135, 1929.

Hochenegg, J.: *Ueber cysten am Hoden und Nebenhoden*. Wien. med. Jahrb. 15:149, 1885.

Jenkins, R. H., and Deming, C. L.: *Cysts of the testicle*. New England J. Med. 213:57, 1935.

Johnson, S.: *Benign tumors; case*. U.S. Navy M. Bull. 48:893, 1948.

Muir, L.: *Benign cystic teratoma (dermoid cyst)*. Brit. J. Surg. 40:144 (Sept.) 1952.

Olsen, J. G., and Calderin, V. O.: *Epidermoid cyst of the testis*. United States Air Force M. J. 6:747, 1955.

Pirot, R., and Moncourier, L.: *Benign embryoma of right testicle with generalized malignant metastases (case)*. Bull. Assoc. France, p. l'étude du cancer 26:338, 1937.

Rose, W., and Carless, A.: *Manual of Surgery*. Ed. 11. New York: William Wood & Company, 1924.

Smith, C. K.: *Large cystic testicle and epididymis*, Urol. & Cutan. Rev. 23:393, 1919.

Verneuil: *Arch. gén. méd.* 5me. Série 5:641, 21: 299, 1855.

Wilms, M.: *Die teratoiden geschwulste des hoden mit einschluss der sogenannten cystoidé und enchondrome*, Beitr. z. path. Anat. u. z. allg. Path. 19:233-366, 1896.

The discovery that man can be scientifically manipulated, and that governments can turn large masses this way or that as they choose, is one of the causes of our misfortunes. There is as much difference between a collection of mentally free citizens and a community molded by modern methods of propaganda as there is between a heap of raw materials and a battleship. Education, which was at first made universal in order that all might be able to read and write, has been found capable of serving quite other purposes.

—Russell

TABLE X

Precipitation reactions of rabbit serum and egg lecithin

	Series of quadrupling dilutions of serum from 1 4						
	1	2	3	4	5	6 10	Control
Serum heated at 90° C	0	0	4	3	2	0	0
3 vols serum heated at 90° C + 1 vol unheated serum	0	0	4	3	1	0	
Equal vols serum heated at 90° C and unheated serum	0	0	2	3	2	0	
1 vol serum heated at 90° C + 3 vols unheated serum	} Negative all dilutions						
Unheated serum							

Readings after 48 hours

LIPOIDS FROM OTHER BACTERIA

Acetone extracts were prepared from certain other bacteria and their precipitation reactions examined as before. The strains used were *Staphylococcus aureus* (both smooth type and rough variant), *B. typhosus* (laboratory strain) and *B. phlei*. It was found that the same types of reaction were obtained as with the extracts of diphtheria bacilli. Thus the lipid factors concerned were apparently widely distributed among bacteria.

OBSERVATIONS WITH LIPOIDS EXTRACTED FROM AN
ANIMAL TISSUE (SHEEP'S HEART MUSCLE)

For this study sheep's heart was selected in view of its frequent use for obtaining the Wassermann antigen. By a study of various types of lipid extracted by different methods from this tissue it was hoped to obtain further data bearing on the comparisons and contrasts among such substances, including the phosphatides responsible for the syphilis reactions.

Methods of extraction and fractionation of sheep's heart lipids

The hearts were freed from visible fat and the muscle tissue minced. Part of the tissue was extracted directly with acetone and part with alcohol at room temperature. The remaining tissue was dried in a vacuum oven over calcium chloride at 50-55° C and then ground to a powder. Separate portions of the dry powder were extracted with chloroform, hot ether followed by hot alcohol in a Soxhlet apparatus, cold alcohol and cold acetone. Portions of the crude alcoholic extracts were retained and cholesterolised for testing and the bulk of the extract concentrated, the residue extracted with ether, the ether solution concentrated and acetone added in order to precipitate the phosphatide fraction. The acetone soluble fat fractions separated during this process were isolated by removal of the acetone. The whole fractionation procedure is set out in table XI. The products were finally made up as 1 per cent solutions in alcohol with 0.15 per cent cholesterol.

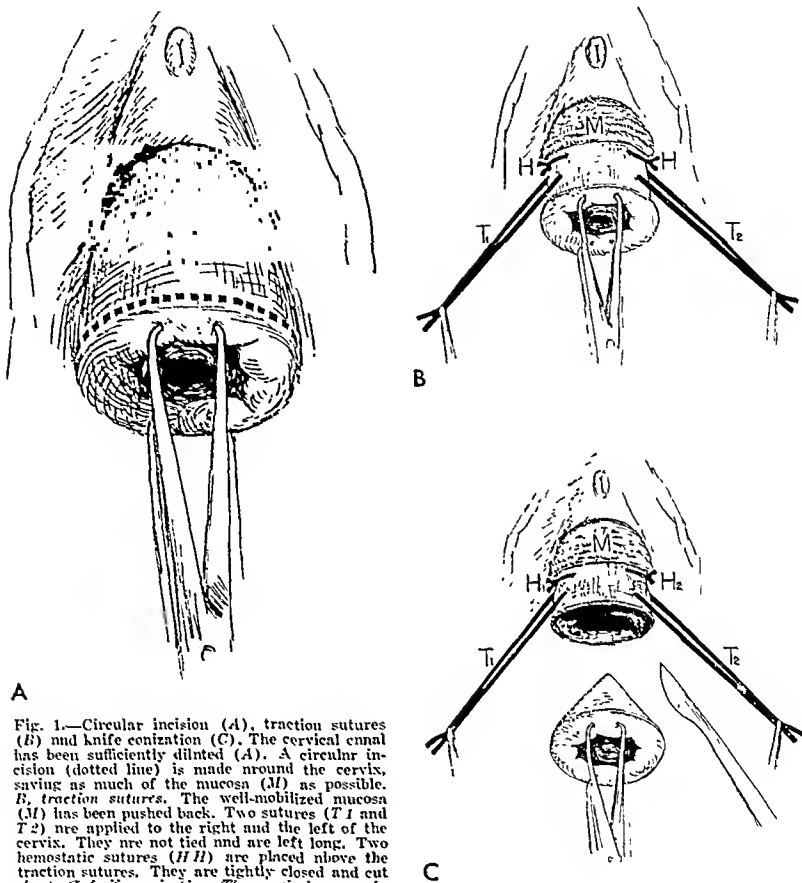


Fig. 1.—Circular incision (A), traction sutures (B) and knife conization (C). The cervical canal has been sufficiently dilated (A). A circular incision (dotted line) is made around the cervix, saving as much of the mucosa (M) as possible. B, traction sutures. The well-mobilized mucosa (M) has been pushed back. Two sutures (T₁ and T₂) are applied to the right and the left of the cervix. They are not tied and are left long. Two hemostatic sutures (HH) are placed above the traction sutures. They are tightly closed and cut short. C, knife conization. The cervix is properly exposed by traction on the sutures T₁ and T₂ by assistants. The cervical cone is excised with the knife.

posterior flap of the mucosa, from the intact to the rough surface (Fig. 3A). Then the posterior wall of the cervix is trans-fixed from the inside of the canal to the

outside (Fig. 3B). The second twin suture runs only through the posterior cervical wall, 0.5 cm. above the first one (Fig. 3C). It does not pass the posterior

The alcohol-soluble ether-insoluble fraction 3b derived from tissue previously extracted with chloroform corresponds to the Wassermann antigen described by Fischer and Gunsberger (1935, 1936) as being practically lipid-free. Such alcohol-soluble ether-insoluble fractions possibly contain the phosphatide substance named carnithin by MacLean and MacLean (1927).

The fractions isolated have been grouped in table XIII (which summarises their reactions with sera) on the basis of solubility properties *e.g.* phosphatides (ether-soluble acetone-insoluble), fats (ether-soluble acetone-soluble) and waxes (chloroform-soluble). The methods of preparation and a study of the analytical data given in table XII show that the fractions constituting these groups cannot be regarded as pure chemical entities and that they probably contain certain amounts of compounds characteristic of the other groups.

It will be seen from table XII that the fractions designated phosphatides have a considerably higher nitrogen and phosphorus

TABLE XII
Analysis of sheep's heart lipid fractions

Fraction	Nature	N (per cent)	P (per cent)	N/P ratio	Acid value	Iodine value (per cent)	Saponification value
2b	Phosphatide	2.82	3.0	2.1	68.8	34.9	218
5c	Phosphatide	2.39	2.86	1.85	77.5	38.5	240
4c	Fat	0.8	0.47	3.8	63.1	29.1	234
5d	Fat	1.16	0.27	0.96	99.2	63.0	177
6c	Acetone extract (fat)	0.47	0.35	3.1	84.6	62.8	195

content than the fats, but that the N/P ratio of the phosphatides is of the order 2/1 instead of 1/1 as would be expected of the lecithins. Whilst too much reliance cannot be placed on these figures, they suggest that the fractions are diamino-monophosphatides. A more detailed chemical study of these lipid fractions is in progress.

The fats were considerably more varied in their analytical values than the phosphatides, which was to be expected since they were residues of crude extracts from which the phosphatides had been separated.

The chloroform extract 3a was a complex mixture of waxes, fats and phosphatides, though possibly richest in waxes. The acetone extracts probably contained fats and waxes with some phosphatide.

Table XIII shows the various lipid products tested and their classification. The types of precipitation reaction obtained with

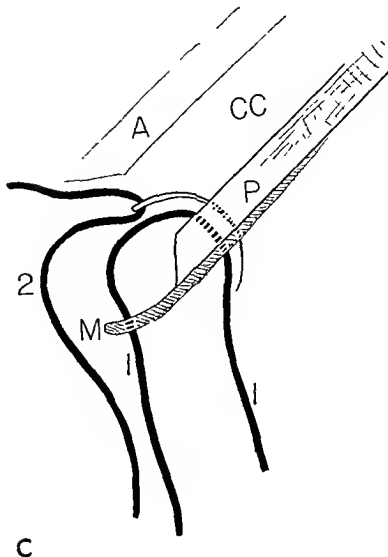
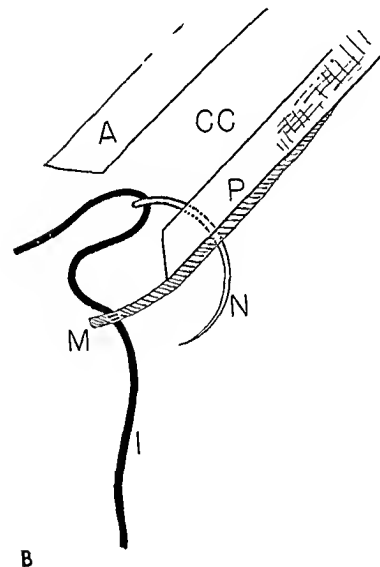
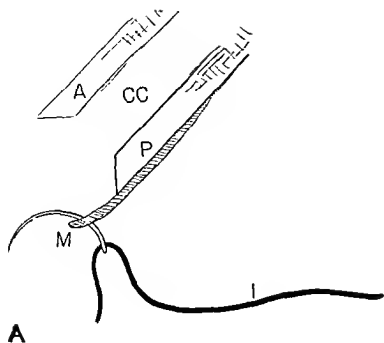


Fig. 3.—A, first posterior twin stitch (first step). The needle with ligature 1 is passed first through the flap (M) in the midline, not too close to its edge, from the outside to the inside. B, the first posterior twin stitch (second step). Posterior cervical wall (P) is passed by the needle (N) in the midline from the cervical canal (CC) to the outside. C, second posterior twin stitch. Needle with ligature 2 is passed only through the posterior cervical wall (P), about 0.5 cm. above ligature 1, from the cervical canal (CC) to the outside. Ligature 2 is not passed through flap (M).

flap of the mucosa.

The posterior set is tied first. The ends of the ligatures at the flap are united by

a square knot in the air.⁴ A hemostat or a knotholder³ is applied closely behind the knot, and the excess of the ligature is cut off (Fig. 4A). The hemostat acts here as a barrier and prevents the knot from being pulled through one of the stitch canals. By traction on the other ends of the twin ligatures, the flap of mucosa is pulled into the cervical canal (Fig. 4A). The assistant supports this maneuver with the previously attached hemostat behind the knot. Thus the tension is considerably reduced and the danger of

The crude alcoholic extracts, which correspond to the antigen generally used for the Wassermann test, gave in most cases the *A* reaction alone, but occasionally weak reactions of other types were noted. In this case the *A* reaction was correlated with the syphilis reaction. The phosphatide fractions gave, as was expected, the *A* type reaction, in most cases unassociated with other reactions though occasionally *C* type effects were noted. Here also (with one exception) the *A* reaction was correlated with the syphilis phenomenon.

As contrasted with the crude alcoholic extracts and the phosphatide preparations, the fats, like the bacterial acetone extracts, gave the *A* and *B* reaction almost constantly, frequently *C* and occasionally *D*. Of course considerable variations in the occurrence of these reactions were noted with individual sera and different lipid preparations. With these preparations the *A* reaction could not be correlated with the syphilis reaction and was classified as *A*₂. The acetone extracts of sheep's heart behaved like the fats.

The chloroform extracts also gave all types of reaction but the *A* effect was in this case correlated with the syphilis reaction.

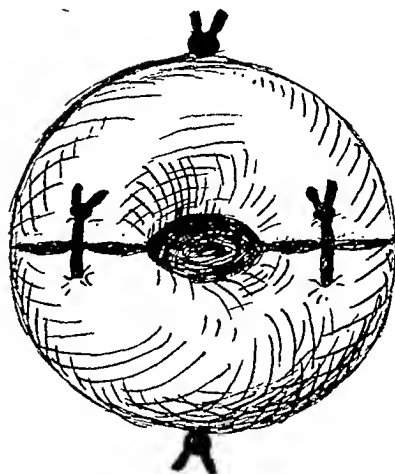
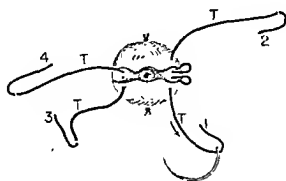
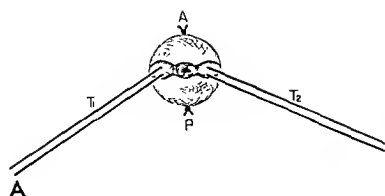
The alcohol-soluble ether-insoluble products resembled the chloroform extracts, giving the *A* reaction. It has been mentioned that one of these products corresponds to Fischer and Günsberger's Wassermann antigen. It gave the *A*₁ and *C* reactions and also with certain sera a *B* effect.

Table XIV illustrates in detail some of the results obtained with these tissue extracts.

TABLE XIV
Precipitation reactions with sheep's heart lipids

Fraction		Series of quadrupling dilutions of serum from 1-4										
		1	2	3	4	5	6	7	8	9	10	Control
5a (Crude alcoholic extract)	Normal human serum heated at 55° 70 and 90° C	Negative all dilutions										
	Syphilitic serum heated at 55° C	4	2	1	0	0	0	0	0	0	0	0
4c (Phosphatide)	Syphilitic serum heated at 55° C	3	0	0	0	0	0	0	0	0	0	0
	" " " " 70 and 90° C	Negative all dilutions										
4c ₂ (Fat)	Syphilitic serum heated at 55° C	4	0	0	0	0	3	0	0	0	0	0
	" " " " 70° C	0	0	0	4	4	3	3	2	0	0	0
	" " " " 80° C	0	0	0	4	4	4	4	3	4	4	0
5d (Fat)	Syphilitic serum heated at 55° C	2	3	4	4	3	1	0	0	0	0	0
	" " " " 70° C	0	0	0	0	1	1	0	0	1	0	0
	" " " " 85° C	0	0	0	4	4	4	4	0	1	2	0
6c (Acetone extract)	Syphilitic serum heated at 55° C	3	2	4	3	0	0	0	0	0	0	0
	" " " " 70° C	0	0	0	0	1	1	0	0	0	0	0
	" " " " 85° C	0	0	0	3	4	4	4	4	3	2	0

Readings after 48 hours



C

traction suture (*T*) and passed through adjacent edge of the mucosa. The same needle is used for passing ends 2, 3 and 4 of traction sutures through respective edge of mucosa. *C*, traction sutures tied, thus closing mucosa.

B
Fig. 5.—*A*, anterior and posterior flaps have been inverted. Traction sutures *T*1 and *T*2, still in place, emerge from gap remaining between flaps of mucosa. *B*, closing of the mucosa with the traction sutures. Empty needle is attached to end 1 of

damaging the flap with the ligature completely eliminated. The other ends of the ties are then united on the outside of the cervix (Fig. 4*B*).

The anterior set of twin stitches is tied in a similar way. The ends of the twin ligatures at the flap are united first. Again, a hemostat is attached to the ligature behind the knot and the excess of the ligature cut off (Fig. 4*C*). Traction on the free ends of the twin ligatures pulls the mucosa, supported by the hemostat,

into the cervical canal. The free ends are then tied at the outside of the cervix (Fig. 4*D*).

The remaining lateral gaps between the anterior and posterior flaps of the mucosa are closed with the previously applied traction sutures, which are still in place (Fig. 5*A*). The four ends of these two ligatures are attached, one after the other, to the same needle and passed through the anterior and the posterior flap close to the edge of each (Fig. 5*B*). The mucosa is

Fig. 4 (opposite).—*A*, tying of the posterior twin stitches. Ends of posterior twin ligatures 1 and 2 at flap (*M*) are united first, and a curved hemostat is placed behind the knot. Flap (*M*) is pulled into cervical canal (*CC*) by traction on free ends (*FF*) of ligatures 1 and 2. *B*, free ends of posterior twin ligatures are united at outside of posterior cervical wall (*P*). The other knot of the twin ligature is in the cervical canal (*CC*). *C*, tying of the anterior twin stitches. The ends of the anterior twin ligatures 1 and 2 at the flap (*M*) are united first and a hemostat is placed behind the knot. Supported by the hemostat, the flap (*M*) is pulled into the cervical canal (*CC*) by traction on the free ends (*FF*) of ligatures 1 and 2. *D*, the free ends of the twin ligatures are united in the midline outside of the anterior cervical wall (*A*). The other knot of the twin ligature is in the cervical canal (*CC*).

TABLE XV

Precipitation reactions of rabbit serum with certain lipoids before and after absorption with a crude heart extract suspension

	Series of quadrupling dilutions of serum from 1 4 (serum heated at 55° C)			
	1	2	3-10	Control
Crude heart extract (A₁)				
Untreated	3	1	0	0
Absorbed, crude heart extract	0	0		
Heart lipid 2b (A₁)				
Untreated	2	1	0	0
Absorbed, crude heart extract	0	0	0	
Heart lipid 2c (A₂)				
Untreated	3	1	0	0
Absorbed, crude heart extract	2	1	0	
Heart lipid 4c (A₂)				
Untreated	2	1	0	0
Absorbed, crude heart extract	2	1	0	

Readings after 48 hours

TABLE XVI

Precipitation reactions of syphilitic human serum with certain lipoids before and after absorption with a crude heart extract suspension

	Series of quadrupling dilutions of serum from 1 4										
	1	2	3	4	5	6	7	8	9	10	Control
Crude heart extract (A₁)											
Untreated	2	2	0	0	0	0	0	0	0	0	0
Absorbed, crude heart extract (Serum heated at 55° C)	0	0	0	0	0	0	0	0	0	0	0
Heart lipid 2c (A₂ and B)											
Untreated	2	2	3	2	2	2	0	0	0	0	0
Absorbed, crude heart extract (Serum heated at 55° C)	2	2	2	0	0	1	2	1	1	0	
Heart lipid 5d (B)											
Untreated	0	0	1	2	2	2	2	1	0	0	0
Absorbed, crude heart extract (Serum heated at 55° C)	0	0	0	0	1	2	2	1	1	0	
Egg lecithin (C)											
Untreated	0	0	0	0	0	1	3	4	4	3	0
Absorbed, crude heart extract (Serum heated at 80° C)	0	0	0	0	0	1	4	4	3	3	

Readings after 48 hours

Note the peculiar shift in the range of the B reactions after treatment of the serum

L'application de points doubles implique les modifications suivantes:

1. Ils sont fixés sur la ligne médiane.
2. Le second point ne passe ni antérieurement ni postérieurement à travers le lambeau muqueux. Ainsi, la ligature doit passer par le bord du lambeau, et le contact entre la muqueuse inversée et la paroi cervicale est amélioré.
3. Le premier des deux points passe à travers le lambeau muqueux qui est le plus éloigné du bord.

Le "rail" cervical, instrument précieux pour les opérations sur le col, qui conduit l'aiguille et protège les tissus, est également décrit.

ZUSAMMENFASSUNG

Es wird über eine neue Art von Zugnähten (T1 und T2), die die folgenden Funktionen erfüllen, berichtet:

1. Sie gestatten eine ausgezeichnete Exposition des Gebärmutterhalses.
2. Sie immobilisieren den Gebärmutterhals und schalten den Gebrauch verletzender Instrumente aus.
3. Sie gestatten einen sauberen Verschluss der Schleimhaut nach der Umstülpung.
4. Sie dienen als zusätzliches Hilfsmittel zur Blutstillung.

Die Verwendung von Doppelnähten erfordert folgende Modifizierungen:

1. Sie werden in der Mittellinie angelegt.
2. Die zweite Naht wird weder vorn noch hinten durch den Schleimhautlappen hindurchgeführt. Infolgedessen muss die Ligatur durch den Rand des Lappens hindurchgehen, und der Kontakt zwischen der eingestülpten Schleimhaut und der Wand des Gebärmutterhalses wird verbessert.
3. Die erste der beiden Nähte wird weiter vom Rande entfernt durch den Schleimhautlappen hindurchgeführt.

Ferner wird ein bei Operationen am Gebärmutterhals nützliches Instrument, die Kollumschiene, beschrieben, die den Weg der Nadel leitet und das Gewebe schützt.

RIASSUNTO

Vengono presentati nuovi metodi di trazione (T1 e T2) che hanno i seguenti vantaggi:

1. Realizzano una eccellente esposizione della cervice.
2. Immobilizzano la cervice ed eliminano l'impiego di strumenti traumatizzanti.
3. Consentono una perfetta chiusura della mucosa.
4. Hanno una funzione emostatica.

La applicazione di due punti comporta:

1. La loro applicazione sulla linea mediana.
 2. Il secondo punto non passa attraverso la mucosa nè anteriormente nè posteriormente.
 3. La prima coppia di punti passa attraverso il lembo di mucosa lontano dall'orlo.
- Viene infine descritto uno strumento molto utile per gli interventi sulla cervice, che serve di guida all'ago e protegge i tessuti.

RESUMEN

Se presentan unas nuevas suturas de tracción (T1 y T2), que tienen las siguientes funciones:

1. Dan excelente exposición del cervix.
 2. Inmovilizan el cervix y evitan el uso de instrumentos traumatizantes.
 3. Permiten un cierre perfecto de la mucosa después de la inversión.
 4. Función hemostática adicional.
- La aplicación de las suturas gemelas incluye las siguientes modificaciones:
1. Se colocan en la línea media.
 2. La segunda sutura no se pasa a través del colgajo de mucosa ni anterior ni pos-

THE INFLUENCE OF PHYSICAL FACTORS ON THE FLOCCULATION OF LIPOID SUSPENSIONS

Hydrogen ion concentration

Over a wide range the influence of pH on the stability of the lipid suspensions was negligible. This was shown by experiments in which suspensions of various lipid fractions were incubated in the presence of a series of buffer solutions ranging from pH 2.5 to pH 10. The lipoids from *B. diphtheriae* strains III and IV, the crude alcoholic extract of sheep's heart used in the Wassermann reaction, ox heart and ox liver lecithins all flocculated at pH 2.5, but were stable between pH 3.0 and pH 10.0. The egg lecithin suspension was stable even at pH 2.5. The *B. diphtheriae* (strains III and IV) lipoids, the Wassermann antigen and egg lecithin were flocculated by N/5 HCl. All suspensions were stable in N/5 NaOH.

Salt concentration

Dunlop and Sugden (1934) showed that with low salt concentrations up to 0.1 per cent, a Wassermann antigen gave a non-specific flocculation with both normal and syphilitic human sera in concentrations from 0.125 to 8 per cent (*i.e.* dilutions 1:5 approximately in the series we have used), whilst with salt concentrations from 0.5 to 1.0 per cent (*i.e.* including the concentration used in our experiments), only syphilitic sera gave characteristic flocculation. With the alcoholic extract of sheep's heart usually employed in this laboratory for the syphilis flocculation test there was precipitation (or flocculation) of the antigen by salt concentrations between 2.5 and 10 per cent in the presence of both normal and syphilitic sera (heated at 55 or 85° C) and also in the absence of serum. With lower concentrations of NaCl, precipitation occurred only with syphilitic serum (in the usual range of serum dilutions) and not with normal serum or in absence of serum. Thus with this antigen the non-specific flocculation described by Dunlop and Sugden was not observed. Egg and vegetable lecithin suspensions were flocculated by all concentrations of NaCl between 2.5 and 10 per cent in both presence and absence of serum heated at 55 or 80° C. These lipoids therefore behaved in the same way as the heart extract. In the case of egg lecithin, with salt concentrations between 1.25 and 0.3 per cent there was the usual C reaction (in the presence of serum heated at 80° C). This reaction had an optimum in 0.625 per cent NaCl. No reactions were observed with serum heated at 55° C in salt concentrations below 2.5 per cent.

Vegetable lecithin with serum heated at 55° C showed the A reaction with 1.25 per cent NaCl, but with lower concentrations of NaCl (from 0.625 to 0.08 per cent) the reaction intensified,

The Management of Pelvic Pain in Women

GILBERT F. DOUGLAS, M.D., F.A.C.S., F.I.C.S., D.A.B., GILBERT F. DOUGLAS JR., B.S., M.D., GEORGE C. DOUGLAS, B.S., M.D., WILLIAM W. DOUGLAS, B.S., M.S., M.D., AND SARAH FRANCES DOUGLAS, B.S., B.A., M.S., M.T.

BIRMINGHAM, ALABAMA

IN analyzing pain from the gynecologist's point of view, it is necessary to limit one's scope to those conditions which are solely within the field of gynecology.

The nerves that supply the ovary are derived from the renal and aortic plexuses; they accompany the ovarian vessels in the tissue of the suspensory ligament of the ovary. The ovaries embryologically arise high in the abdomen and thus receive their nerve supply from a source other than that which supplies the other pelvic viscera. Pain of ovarian origin is caused chiefly by stretching of the capsule or disturbance of the circulation, or both. Benign or malignant tumors of the ovary do not ordinarily cause pain until they produce peritoneal irritation or stretching.

A more frequent cause of pain originating in the ovary is ovulation; such pain is commonly termed "mittelschmerz." Since the gynecologist must be a skilled diagnostician, his most important aid to diagnosis is a carefully performed pelvic examination.

Most uterine tumors are asymptomatic *per se*. When signs and symptoms are present, they result from the physical presence of the tumor, or from pressure on and adherence to surrounding structures, or from secondary changes in the tumor itself.

Carcinoma of the uterus, whether in the body or the cervix, is notoriously asymptomatic until its processes involve contiguous structures or nerves. A frequent cause of pain in the lower part of the abdomen is a postabortive process which involves the uterus primarily. Extreme degrees of procidentia may produce discomfort and pain in the lower part of the pelvis. The pain is caused chiefly by the enteroptosis that follows descent of the pelvic viscera and the resulting damage in the intra-abdominal contents.

Dysmenorrhea, or painful menstruation, is usually spoken of as a disease, though actually it is a symptom or manifestation of some underlying organic or functional abnormality. Presacral sympathectomy with complete excision of the superior hypogastric plexus, as proposed by Cotte, is an especially effective form of therapy in those cases in which no pathologic changes can be discovered outside the uterus. Membranous dysmenorrhea is usually characterized by severe pain and the passage of shreds in the menstrual blood. Such a shred at times amounts to a complete cast of the uterine body.

Ectopic pregnancy occurs most commonly in the fallopian tube and is one of the causes of severe pelvic pain, particularly at the time of ingestion. Thrombophlebitis of the deep pelvic veins is not uncommon and should not be overlooked in the diagnosis of deep pelvic pain. Heparin or dicumarol is now widely used in the treatment of such conditions. Excessive prolongation of the prothrombin time

From the Department of Gynecology, Medical College of Alabama, Division of the University of Alabama, Birmingham, Ala.

Presented at a Regional Meeting of the Mid-Atlantic Division, United States Section, International College of Surgeons, White Sulphur Springs, West Virginia, Feb. 10-13, 1957.

Submitted for publication Feb. 7, 1957.

happen The similarities between the A_1 and A_2 reactions would suggest that the latter effect is also due to an antibody-like principle, though reactive with different lipid substances

It has been possible to differentiate the respective serum factors of these phenomena by absorption tests with the appropriate lipoids Thus absorption with a lipid preparation yielding the A_1 reaction may remove the reactivity of a serum for such a lipid without affecting activity in the A_2 reaction A corresponding reciprocal effect has not been obtained so regularly by treatment of serum with a lipid yielding the A_2 reaction, such treatment tending to reduce also the activity with phosphatides These absorption phenomena are significant in regard to the assumption that antibody-like principles are involved It may also be noted that the reactivity of serum is not readily affected by non-specific adsorptive agents

A third type of reaction, designated B , has been demonstrated, differing from A in the higher reactive range of serum dilutions but resembling it in the degree of thermolability of the serum This B effect is a frequent characteristic of normal animal serum and in general it is produced by the same groups of lipid products as give the A_2 reaction, though the two effects are frequently dissociated It has never been observed with phosphatides The similar thermolability of the serum to that noted in the case of the A reactions brings the B effect into line with the former, and suggests that an analogous mechanism may be responsible

From this study two additional types of reaction have come to light, dependent, however, on a somewhat different mechanism from that of the A and B phenomena The activity of the serum in this case is highly thermostable and in unheated serum or serum heated at 55°C is generally inhibited by a thermolabile factor These reactions are therefore only manifest, as a rule, when diluted serum has been heated at $70\text{--}90^\circ\text{C}$ The two effects differ as regards their reactive ranges of serum dilutions one type of reaction, C , has a lower range than the other, D The C effect is a fairly constant result of the interaction of normal serum and various lipoids, and even phosphatide preparations have sometimes given it though less frequently than the fats The D reaction is rarer, though it has been observed not uncommonly with acetone-soluble lipoids It is remarkable in respect of the very high dilutions of serum with which it occurs It has been impossible to ascertain the thermostability limit of the serum for these reactions, as even diluted serum when heated over 90°C undergoes such a degree of coagulation as to prevent its being tested It is of interest, however, that the C reaction is not given by the uncoagulated portion of ox serum which has been partially coagulated by heating to $80\text{--}90^\circ\text{C}$ This shows that the serum proteins are involved. The

quite exsanguinated. If a patient has missed a menstrual period, even by a few days, this is often a cue; one of the simpler methods of early diagnosis of ruptured ectopic pregnancy is a cul-de-sac puncture revealing blood that does not coagulate normally. In probably 80 to 90 per cent of the cases the patient has missed a menstrual period. There is probably the beginning of a flow, or at least a show of blood. Some of the pain is frequently of value in ectopic rupture due to the blood irritating the peritoneal cavity about the diaphragm, etc.

Ovarian neoplasms do not always produce early pain, but if a solid tumor is present it should be regarded as possibly a malignant tumor.

In evaluating the pain which is complained of by individuals we should not overlook the so-called traumatic abdominopelvic pain. A certain number of patients will come into this category, but certainly they should not be so classified until all possible forms of pathologic change have been ruled out.

Relief from certain types of pelvic pain can be obtained by sympathectomy and the intraspinal injection of alcohol. The intractable pain associated with carcinoma of the uterus, particularly the cervix, is relieved by such procedures. Pelvic sympathectomy, or removal of a part of the sympathetic nerve plexus, known as the presacral nerve or the superior hypogastric plexus, is not a serious operation. The intraspinal injection of alcohol is used on occasion by some neurosurgeons and has proved valuable.

Guerriero and Stuart did an elaborate piece of work on "checking out" the chief complaints of 5,539 patients who were admitted to the hospital under their observation with the chief complaint of pelvic pain. There were 1,371 cases in which the pain was of gynecic origin or simulating gynecic pain. Five hundred and seventy-

one, or 41.6 per cent, of these women actually had pelvic pain of other than gynecic origin, and 800, or 58.4 per cent, had gynecic states to explain the origin of their pain. Guerriero and Stuart stated that only 10.6 per cent of these women required major operations for the relief of pain. They recommend that, unless an acute state requires it, operation can be deferred until the cause of the pain has been determined.

The management of severe dysmenorrhea and pelvic pain is as much a problem now as it was in 1852, when Marion Sims stated in his handbook on gynecology: "Of all the newly found drugs, not any is of much value to the woman with severe cramps, except laudanum." In 1921 Leriche made a complete study of the pelvic sympathetic system in its relation to pelvic pain. He developed periarterial sympathectomy of the internal iliac arteries. In 1925 Cotte noted that the same results could be obtained by resection of the superior hypogastric plexus. Cotte called the superior hypogastric plexus the presacral nerve.

The pain of cervicitis, the pain of labor in its first stage and the retrombilical (not umbilical) pain of appendicitis are pure visceral pains, deep-seated, ill localized and with no somatic component.

Rupture of the corpus luteum may present a clinical picture essentially similar to that of a ruptured follicle, except that the time of onset of menstruation is different. Many women with acute bilateral pelvic pain do not have pelvic inflammatory disease, at least not in an acute inflammatory stage.

Pelvic cellulitis is observed most frequently during the puerperium; it often occurs, however, in nonpregnant patients after uterine or cervical instrumentation.

Intraperitoneal rupture of a tubo-ovarian abscess is a major catastrophe. The patient may or may not have been known

C and *D* types of reaction The high thermostability might at first sight exclude an antibody factor, though it must be noted that certain types of antibody may resist high temperatures even to the point of denaturation of the serum protein (see Marrack, 1934)

No reactive properties have been demonstrated with bacterial lipoids as apart from those of tissue origin The reactions with normal serum and bacterial lipoids require to be borne in mind in testing antibacterial sera for specific reactions with lipid extractives in view of the relatively high titre of serum in which certain of these effects may occur Thus a number of reports describing antigen-antibody reactions with alcoholic extracts of bacteria have appeared Freund (1927), Boquet and Nègre (1923), Krah and Witebsky (1930) and Machebeuf and Cassagne (1935), among others, have shown that antisera for *B diphtheriae* give complement fixation with methyl- or ethyl-alcoholic extracts of the organism and also with similar extracts from the diphtheroids and *B tuberculosis* Complement fixation reactions only have been used, except in the work of Freund who also obtained weak precipitation reactions with undiluted antisera It seems possible that these reactions may be due to such phenomena as those described in the present paper In this connection reference may be made to the observations of Eisler and Ehrlich (1927) who have described non-specific precipitation reactions with normal serum and alcoholic extracts of various bacteria

The lipid products obtained by extraction and fractionation from sheep's heart are not chemical entities but mixtures whose main constituents vary with the mode of derivation The preparations have been grouped according to their solubilities (table XIII) In spite of the complex mixture of constituents in the crude alcoholic extracts they regularly give the A_1 reaction only The phosphatide fractions isolated from such extracts also yield the A_1 reaction only, but the acetone-soluble fats separated from the same extracts very frequently produce multiple effects, A_2 , *B*, *C* and *D* A somewhat analogous case is that described by Taylor and Adair (1935) who found that, on titrating an antiserum containing two different antibodies with a mixture of the corresponding antigens, one or two zones of precipitation occurred, depending on the proportion of the antigens present They concluded that a single zone does not necessarily indicate a single antigen-antibody reaction but that multiple zones imply the presence of more than one system The commercial egg lecithin and vegetable lecithin examined were also very impure and contained cephalin (alcohol-insoluble) and a large proportion of fats But in spite of such complexity the egg lecithin yielded a single reaction (*C*) The crude acetone extracts from both sheep's heart and bacteria have essentially the same constituents (fats, waxes and some phosphatide) as the acetone-

vessels and viscera are not discussed here). The relaxation of the pelvic joints that precedes menstruation and accompanies pregnancy is a common cause of pelvic pain. A clinical method of measuring the motion of the intrapelvic joint has been presented by Pitkin.

In a discussion of the nervous pathways involved in pelvic pain, Wilson and Mussey discussed somatic innervation, which includes both the sensory and the motor nerve supply to the frame of the body. Visceral innervation is effected by the autonomic, or involuntary, nervous system. It is stated that pain is but one of the sensations carried by sensory nerves. Cutaneous pain is always of the same quality, no matter what the reason for it may be, and is not difficult to localize. Even with combined reflex and direct sympathetic nerve response to pain, the pelvic organs remain relatively insensitive.

"Pelvic myalgia" is a term coined to describe a painful spasm of the piriformis group of muscles. The muscles that are affected either singly or in groups are (1) piriformis, (2) inferior gemelli, (3) superior gemelli, (4) obturator internus, (5) gluteus medius, (6) levator ani and (7) coccygeus. In attempting to diagnose such pain by sweeping the finger laterally from the coccyx to the acetabulum and back to the coccyx several times, the entire surface area of the muscular ridge is massaged; gentle massage is continued in a plane perpendicular to the first maneuver, gradually working laterally to the acetabulum. These procedures are repeated on the opposite side. This treatment is beneficial in massaging the piriformis muscle.

Myalgia is one of those conditions causing pain not usually associated with the pelvis, and without careful digital examination the pain probably would not be exaggerated by the maneuver. Powell stated that in about 10 per cent of these cases the pain is made worse temporarily by this maneuver, but that massage should

be continued at intervals until the condition subsides.

It must be stressed that pelvic myalgia is not a clinical entity but a complication of posterior urethritis, an anal or rectal pathological condition or an orthopedic defect.

The object of nerve resection and nerve block for gynecologic disorders is nearly always the relief of pain.

As has been stated, Leriche, in 1921, introduced periaarterial sympathectomy of the internal iliac (hypogastric) artery for the relief of pelvic pain and obtained good results. In 1924 Cotte noted that if he sectioned the superior hypogastric plexus (presacral nerve of Latarjet) he obtained results as good as those obtained by Leriche. Latarjet, in 1913, described and named the presacral nerve as a distinct nerve.

The intrapelvic organs in which the abdominopelvic pains originate are innervated exclusively by the autonomic nervous system, most of them — the uterus, salpinges, rectum, bladder and probably the pelvic peritoneum — through the plexus hypogastricus; the ovaries, through the plexus ovaricus.

The pains of dysmenorrhea usually begin on the same day as the hemorrhage, but not infrequently earlier.

It is unfortunate that so many patients, and far too many doctors, are imbued with the idea that the only solution for many of the ailments of women, especially for chronic pain and discomfort in the abdominopelvic region, is surgical. Much is attributed to postoperative adhesions, but it should be remembered that adhesions cause pain only when there is obstruction or traction and that adhesions between tubes and ovaries, uterus and bowel, and bowel and bowel do not cause pain. Women who complain of chronic low abdominal or abdominopelvic pain are "pushed around," medically and surgically speaking, much more than are any other group of pa-

the normal serum of various animals. This effect is mainly associated with the phosphatide fractions of lipid extracts. It can be obtained with a vegetable lecithin as well as with phosphatides from animal tissue.

3 Another type of reaction (designated A_2) is defined, which corresponds in certain respects to the syphilis reaction but is produced by different lipoids, e.g. acetone-soluble fats. This effect is a fairly constant property of animal serum, including normal human serum.

4 A third type of reaction (designated B) is defined, differing from the A type in the higher reactive range of serum dilutions but depending apparently on an analogous serum principle. It is produced by the same groups of lipoids as the A_2 reaction.

5 Two further types of reaction are described (designated C and D) which differ from A and B in the high thermostability of the serum property and in their inhibition by a thermolabile factor in the serum. They differ from one another in the reactive range of serum dilutions, D occurring in a higher range than C .

6 The C reaction is a fairly constant property of normal animal serum acting with various lipid products, particularly acetone-soluble fats. The D reaction is less frequent and when it occurs is usually associated with C .

7 Individual specimens of serum vary in reactivity as regards the different effects and, though all types of reaction (A_1 or A_2 , B , C and D) may occur with the same serum and a particular lipid product, these may nevertheless occur independently of one another.

8 These reactive properties are widely distributed among animals though the serum of certain species may lack certain properties and young animals may lack the A_1 and A_2 factors.

9 It has been possible to absorb from serum the factors for the A_1 , A_2 and C reactions by treatment with the appropriate lipoids. In this way the factor for the A_1 reaction can be differentiated clearly from the A_2 , B and C factors.

10 The conclusion is drawn that these reactions are not primarily due to physical factors but depend on chemical interactions between lipoids and particular constituents of serum which, in the case of the A and B effects, resemble in some respects certain natural antibodies.

11 The reactive properties of various classes of lipid fractions are demonstrated and the question of the association of the different types of reaction with particular lipid compounds is discussed.

The expenses of this work were defrayed by grants from the Lewis Cameron Research Fund, Edinburgh University. We have to express our thanks to Dr Batchelor of the Royal Infirmary, Edinburgh, for specimens of syphilitic and normal human sera.

might better be described as somatogenic or psychogenic. In the development of a psychosomatic disorder there are three requisites: (1) a psychoneurotic predisposition, (2) an exciting emotional conflict and (3) restriction of outward expression of the conflict.

It should not be overlooked that pain is a symptom common to all parts of the body. The genital tract is, of course, no exception. It is estimated that pelvic pain accounts for at least 35 per cent of the admissions to a gynecologic ward. The urologic system or phase should not be overlooked by anyone at any time in diagnosing obscure pains in the pelvis or the lower part of the abdomen, especially if the complaint is chronic.

Pain, as Mengert has classified it, might be categorized as follows:

Pain of genital origin

1. Pain due to gonorrhea, pelvic inflammatory disease, pelvic cellulitis or hemorrhage.

2. Pain due to uterine prolapse, adhesions, twisted pedicle of ovarian cyst

3. Pain due to periodic distention of an endometrial implant

4. Pain caused by tumor incarcerated in the pelvis

5. Pain accompanied with rupture of uterus, tube or bladder.

Pain of extragenital origin

1. Pain originating in pelvic neurosis

2. Pain originating in other pelvic structures: (a) bony, sacroiliac; (b) urinary tract, or (c) intestinal tract: colitis, diverticulitis, appendicitis.

Hemorrhage from a ruptured follicle, a cyst of the corpus luteus or ovulation may at times be confusing. Chronic pelvic pain is often the result of pathologic change in the cervix. Deep-seated dyspareunia is frequently due to a chronic disease of the cervix. Uterine prolapse of the second or third degree can cause pain by producing the dragging-down sensation. A retrodis-

placed uterus is not looked upon as a cause of pelvic pain nearly as often as it formerly was.

There is grossly little clinical or pathologic similarity between adenomyosis and the large "chocolate cyst" of the ovary.

An idea commonly accepted by the laity is that pelvic pain indicates disease of the female organs. The majority of women seen by the gynecologist seek medical attention because of pain low in the abdomen or the back. The investigation of pelvic pain, therefore, may be time-consuming and expensive, but the patient still merits a detailed survey before an exploratory operative procedure or any nonindicated drug therapy is employed. The gynecologic diseases causing pelvic pain might be listed as: (1) cervicitis and parametritis; (2) uterine enlargement; (3) pelvic endometriosis; (4) malposition of the uterus; (5) pelvic congestion, and (6) adnexal disease. Cervicitis is manifested by erosion, hypertrophy, eversion, cystic change and laceration. Enlargement of the uterus causes backache and abdominal pain because of pelvic congestion due to the stretching of supportive ligaments, due in turn to the increased size of the uterus.

Endometriosis of the pelvic viscera has a high place among gynecologic causes of pelvic pain. Gynecologists are becoming more keenly aware of this condition, and the diagnosis is much more frequently made in recent years than it formerly was.

The presence of tender cul-de-sac nodules, a retroverted, tender uterus and fixed adnexae in a patient who complains of backache, pain in the lower part of the abdomen, dysmenorrhea and dyspareunia offers strong evidence that endometriosis is present. Uterine malposition, particularly prolapse, is a frequent cause of low abdominal pain and backache. Taylor amplified the concept of pelvic congestion as a cause of pelvic pain and a "congestion fibrosis"

die intraspinal Alkoholeinspritzung von Nutzen sein.

Der Durchbruch eines Abszesses des Eileiters oder des Eierstocks in die Bauchhöhle stellt eine Katastrophe grösseren Ausmasses dar. Man sollte sich nicht zu umfangreichen Versuchen, eine Drainierung des Beckens auszuführen, verleiten lassen.

Durch die Entbindung hervorgerufene Verletzungen, Zystozelen, Rektozelen und Vorfälle der Gebärmutter sind Erkrankungen, die nicht übersehen werden dürfen.

Der Schmerz wird heute von manchen Autoren als ein von den übrigen Sinnen (Gesicht, Gehör, Geschmack, Geruch und Gefühl) getrennter sechster Sinn aufgefasset.

Es gibt drei Arten von Nerven, die das Becken, das Harnsystem usw. versorgen: die somatischen oder zerebrospinalen, die sympathischen und die parasympathischen.

Myalgien werden im Becken gewöhnlich nicht beobachtet, können aber gewisse Muskeln befallen: die Piriformisgruppe, den unteren Piriformis und die oberen Zwillingsmuskeln, den Obturator internus, den Gluteus medius, den Levator ani und den Coccygealis.

CONCLUSOES

A dor é um dos sintomas que mais frequentemente levam a mulher ao médico. A dor pélvica é responsável na maior percentagem dos casos. A ovulação causa mais dor do que se supõe habitualmente. O carcinoma do útero, do corpo ou do colo uterino, é notoriamente assintomático.

A rutura de prenhes ectópica também é uma causa frequente de dor associada com choque. Não deve ser desprezada a possibilidade de uma tromboflebite como causa de dor pélvica ou dos ligamentos largos.

No diagnóstico diferencial não deve ser esquecida a tuberculose tubária. Nos tipos de dor incurável a simpatectomia e as injeções de álcool intrarraquideas podem ser benéficas.

A rutura intraperitoneal de um abcesso tubo-ovariano constitui uma grande catástrofe. Devem ser evitadas manobras largas para obter drenagem pélvica. As lesões obstétricas, a cistocèle, a retocèle e o prolapso uterino não devem passar despercebidos. A dor é atualmente considerada por alguns como um sexto sentido isolado dos elementos sensoriais (visão, audição, gustação, olfacção, gustação e sensibilidade tátil).

A inervação da pelvis, do aparelho, urinário, etc., é de três tipos: somático ou cerebro-espinhal, simpático e parasimpático.

A mialgia não é habitualmente observada na pelvis mas pode atingir certos músculos: o grupo piriforme, o piriforme inferior os gêmeos superiores, o obturador interno, o médio glúteo, o elevador do ânus e o coccígeo. O diagnóstico de dor produzida por cálculos, estreitamento ureteral ou infecção urinária deve sempre ser estabelecida antes da operação radical.

CONCLUSIONES

El dolor es uno de los síntomas que mas frecuentemente traen a las mujeres al médico. El Dolor pélvico es responsable en la mayoría de los casos.

La ovulación causa dolor mas frecuentemente de lo que se cree.

El carcinoma del útero, tanto del cuerpo como del cervix, es notoriamente asintomático.

Un embarazo ectópico roto es causa frecuente de dolor asociado con shock.

No debe pasar inadvertida la trombo flebitis como causa de dolor en la pelvis o en los ligamentos anchos.

La tuberculosis de las trompas no debe dejarse inadvertida en diagnósticos ó diagnósticos diferenciales.

La simpatectomia y las inyecciones intraespinales de alcohol pueden ser benéficas en casos de dolor. 1 tipo intratable.

Primary Carcinoma of the Fallopian Tube

Report of a Case

J. MARK COX, M.D., F.I.C.S., D.A.B.

WASHINGTON, D.C.

THE rarity of primary carcinoma of the fallopian tube prompts this report. This is one of the rarest of all malignant diseases. Only a few over 500 cases have been reported in the literature¹ up to the time of writing. The diagnosis is seldom made before operation.² A greater familiarity with this subject on the part of more surgeons is desirable, because this lesion is one of the most malignant of body cancers.³

Incidence.—The reported incidence varies between 0.31 per cent and 0.5 per cent of female pelvic malignant tumors.⁴ In one controlled series of 12 cases, it was as low as 0.16 per cent. The lesion has been observed in patients from 17 to 80 years of age. About three-fourths of the patients in the cases reported were past the menopause and were nulliparous. Wechsler reported that two-thirds of his patients were between 40 and 45 years of age, and Hu stated that most of his were between 40 and 65.^{4a} Raynaud is given credit by some authors for recording the original case in 1847. By others, the credit is given to Orthman (1886) for the first description.^{4a}

Pathologic Picture.—The pathologic picture was first described by Rokitansky in 1861.⁵ In the cases reported the tumor has been adenocarcinoma.^{1b} It arises in the mucous membrane and shows a papillary pattern. It usually causes the formation of a hydrosalpinx, and the symptoms are those of inflammation of the fallopian tube.^{1a} Spread may take place by lymphatics, blood stream, direct extension and

peritoneal implantation. It is similar to the spread of ovarian malignant neoplasms and often involves the retroperitoneal route to the presacral nodes.⁶ The carcinoma is often not discovered until the tube is opened. The lesion is usually in the distal two-thirds of the tube and often is associated with tuberculosis in the tube.^{1a} In a few cases it has been diagnosed by Papanicolaou smear before operation.⁷

Prognosis.—In about 25 per cent of cases recurrence has taken place in one year.^{1a} Survival rates have been discouraging; less than 4 per cent of the patients were reported to have survived for three years.^{4a} Haupt reported only 6 survivals among 321 patients in eight years.^{1a}

Symptoms.—Authors agree that pain is an early symptom. The pain may be sharp and intermittent or persistent and dull. It is usually located in the region of the affected tube and in the back.⁴ Occasionally it is referred to the bladder or the rectum or radiates down the leg.⁸

A mass is usually palpable in the pelvis or the abdomen, and the lesion may be confused with salpingitis, ovarian cyst, myoma of the uterus or ectopic pregnancy.⁹ Occasionally the mass may disappear or become smaller after a vaginal discharge.^{4a} Vaginal discharge of some kind is usually present and may vary from leukorrhea to bleeding. Any serous or serosanguinous discharge from the cervix should cause suspicion of an ovarian lesion.

From the Hadley Memorial Hospital, Washington, D. C.
Submitted for publication Jan. 31, 1957.

induced by a suitable carcinogenic substance, for in this case there is no convincing evidence of any profound change in the rest of the organism. From a study of the endocrine organs in a number of mice which had been painted with benzpyrene, dibenzanthracene or tar, and which had developed cutaneous cancer, we can affirm that these substances do not produce the profound changes in the endocrine apparatus corresponding to those found after treatment with œstrin. The question arises, therefore, whether such changes are related ætiologically to the development of malignancy in the mamma.

In the following communication we discuss this question with reference to the adrenal changes. These are of particular interest for two reasons. (1) they are specific in the sense that they have never been observed previously by us in the adrenals of mice of mixed strains up to nine months of age, although the adrenals of more than one thousand such mice have been examined by one of us (W C) during a period extending over more than fifteen years, (2) they occur spontaneously in the adrenals of mice belonging to a genetically pure strain with a high incidence of spontaneous mammary cancer.

EXPERIMENTAL METHODS

Histological technique

For the examination of the adrenal glands we have used almost exclusively the osmic vapour method. This method (see appendix) was devised twenty years ago (Cramer, 1918-19) because the ordinary histological and cytological methods were found to be quite inadequate for a study of these glands. By ordinary methods the adrenalin contained in the medullary cells is washed out by the water or alcohol of the fixing fluid, while the lipoids of the cortex are removed in the subsequent passage of the fixed material through alcohol and xylol. A preparation obtained in this way represents little more than the ghost of the gland, and since the adrenal changes described in this paper consist partly in the abnormal formation of what is probably abnormal lipid material, the usual histological methods show little more than differences between two ghostlike structures. Frozen sections stained with sudan III or schiarlach R give some information concerning the occurrence and distribution of lipid material, and methods involving the use of bichromate followed by osmic acid give a fairly good picture of the distribution of lipid material and a crude indication of the adrenalin content of the medullary cells. But neither of these methods approaches the osmic vapour method, which not only possesses the above mentioned advantages but also affords an insight into the finer cytological changes, especially the nuclear changes, and records evidence even of the secretory activity of the medulla with exquisite detail. The method has been of special value in the study of the changes produced by œstrin, because it gives a positive picture of the change, and not, as the routine histological methods do, a negative one. It is thus possible to trace the change back to its earliest stages.

enlarged and cystic. The right ovary was normal, as were the uterus and the appendix.

A left salpingo-oophorectomy was done. The distal end of the right fallopian tube was removed. Appendectomy and plastic repair of the proximal end of the right tube were performed. The specimen was not opened at operation, and a frozen section was not done. No other evidence of pathologic change was noted.

After the routine processes of pathologic examination, a diagnosis of primary carcinoma of the fallopian tube was made, and the patient was relaparotomized on May 7. A wide panhysterectomy with right salpingo-oophorectomy, node dissection and high ligation of the ovarian vessels was done. No evidence of metastasis was detected.

Pathologist's Report: Pathologic examination of the left fallopian tube revealed tissue measuring 13 cm. in length and with diameters ranging from 3 to 6.5 cm. The outer surface was irregular in contour. The structure appeared to be a tremendously distended fallopian tube which, in one area, had the appearance of having become an abscess. Section into this larger area revealed the tissue within to be gray-yellow and extremely friable. Section through the portion that was less enlarged, revealed within it structures that were still fairly soft and showed no definite tubal topographic features. At one end of this mass was what appeared to be ovarian tissue, consisting of variegated color cysts.

The right tube measured 8 by 2 to 3 cm. and had a central lumen. The appendix was not remarkable in appearance. The smooth-walled cyst measured 4 by 2.5 by 2 cm., contained clear yellow fluid and had a smooth inner surface.

Microscopic sections from the left tube revealed a neoplasm containing fairly large cells with dark-staining cytoplasm and fairly large and uniform nuclei, with a moderate number of mitoses. Arrangement of the cells in papillary and glandular formation was also noted. Adjacent to the tumor, which was extensive, were areas of necrosis and areas of inflammation. The stroma about the tumor consisted of muscular and fibrous tissue, which was not definitely identifiable, and ovarian or fallopian tube structure. Occasional cystic structures lined with low columnar epithelium were seen. The diagnosis was adenocarcinoma of the fallopian tube.

Pathologic study after the second operation revealed (1) chronic cervicitis and hyper-

plastic endometrium in the secretory phase of activity, (2) ovarian tissue and (3) fallopian tube.

Roentgen Picture: Roentgenograms of the chest and an intravenous pyelogram in follow-up gave negative results. The patient was given a course of high voltage roentgen therapy by a private radiologist.

Follow-Up: Two years and nine months after the operation the patient began complaining of severe pain in the back, the right lower abdominal quadrant and the lower extremities. She also complained of increased obesity.

Examination revealed abdominal swelling, enlargement of the liver and a mass in the neck. With this evidence of metastasis, the prognosis is grave.

SUMMARY AND CONCLUSIONS

Primary carcinoma of the fallopian tube is one of the rarest of all malignant diseases and is seldom diagnosed before operation or autopsy. Pelvic pain, a palpable pelvic tumor and a vaginal discharge that often relieves the pain intermittently are suggestive of extrauterine malignant change. The treatment of choice is bilateral salpingo-oophorectomy with wide panhysterectomy and node dissection. High voltage roentgen therapy is advocated but of doubtful value.

RÉSUMÉ ET CONCLUSIONS

Le carcinome primaire des trompes de Fallope est une des tumeurs malignes les plus exceptionnelles, et il est rarement diagnostiqué avant l'opération ou l'autopsie. Les douleurs pelviennes, une tumeur pelvienne palpable, et un écoulement vaginal provoquant souvent une atténuation intermittente des douleurs, indiquent une modification extra-utérine maligne.

Le traitement de choix est une salpingo-oophorectomie bilatérale avec panhystérectomie avec dissection nodulaire. Une thérapeutique de rayons X à hautes doses est préconisée, bien que leur efficacité apparaisse douteuse.

PLATE LXIX

- FIG 1—Mouse 565 Castrated male, mixed strain, treated with ketoxyhydroxy oestrin for 7 months Frozen section, fixed formol saline, stained sudan III A ring of isolated masses of sudan stained brown degeneration lies around the medulla Low power
- FIG 2—Mouse 237 D Z male, aged 11 months, untreated Fixed in osmic vapour Very advanced stage of brown degeneration extending into both medulla and cortex A piece of degenerated brown tissue is seen lying free in the lumen of the central vein Low power, camera lucida drawing

Ophthalmologic Surgery

The Beta Applicator as an Ophthalmic Therapeutic Tool^{*}

FRED M. WILSON, M.D.

INDIANAPOLIS, INDIANA

IN order to consider beta radiation as a therapeutic tool, one must first understand something of its mode of action. The following facts are pertinent:

To be effective, radiation must be absorbed by tissue, not just pass through. High energy radiations, therefore, pass through the anterior segment of the eye with too little absorption to be therapeutically effective, but beta particles from radium, radium D, radon and radioactive strontium penetrate only superficially and are absorbed by the tissues of the anterior segment.

This absorption releases energy in each tissue cell involved, causing damage by ionization, especially in the nucleus, to a degree that varies with the dose. This damage can result in cellular death either from an overwhelming single dose or from cumulative effects. Damaging effects from smaller doses, however, may permit tissue recovery, but, reversible or not, the effect of radiation is always to damage, if not to destroy.

Indications.—*Pterygium* is the most common indication for beta therapy, and both the primary and recurrent forms are

treated the same way. Beta radiation is used postoperatively rather than as the only treatment. This not only reduces the dosage considerably but improves the cosmetic result. The usual procedure is to resect the pterygium, leaving a large bare area of sclera, which is then partially closed along a horizontal line by mobilizing the conjunctiva. A bare scleral crescent remains near the limbus, however, and it is here that the postoperative irradiation is applied, causing subsequently a tight, avascular scar, across which recurrence is rare. As a rule, this requires two beta treatments, one about five days after the operation and again in three or four weeks, especially if there is a tendency to some limbal vascularization at some particular point during this time.

Beta radiation alone can be used to stop the progression of pterygium, reducing it to a dense, inactive scar. This scar is white, however, and not cosmetically satisfactory. For this reason and because considerably more radiation is needed to effect this change than to prevent recurrence after operation, beta irradiation is not recommended as an exclusive and primary treatment of pterygium, but should be used postoperatively.

Chronic inflammatory tumor or excess granulation tissue also can be treated by beta therapy. These oc
sma io

^{*}From the Department of Ophthalmology, Indiana University Medical Center.

^{*}Read at the Twenty-First Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.

^{*}This study was supported by Grants-in-Aid from the National Society for the Prevention of Blindness, Inc., and Better Vision Fund, Indiana University.

Submitted for publication Jan. 2, 1957.

only the smallest amount of radiation that will give symptomatic relief should be used. This will usually call for considerable patience, since weeks frequently grow into months as enough time is allowed to evaluate the response to therapy. I often predict to patients that little relief will be obtained from beta radiation this season, but by next year the symptoms will usually be less severe. After that, control may be achieved with relatively small doses of radiation.

Corneal vascularization is still frequently an important indication for beta therapy, but with some definite restrictions. Corneal vascularization alone is not an adequate indication for treatment, and it is usually wise to observe the following indications: 1. The blood vessels in the cornea must be superficial, that is, in the anterior third of the stroma. 2. They should be actively blood-bearing. 3. They should be symptomatic, with corneal edema, producing haziness or irritability, sometimes with recurrent erosions. 4. Before radiation is begun, the inflammatory process, which stimulated the vascularization in the first place, should be in remission, or in other words, the corneal vessels must have served their purpose and no longer be needed.

Since irradiation may be used to destroy corneal vascularization before keratoplasty, it is well to restate the general rule that wound healing can be seriously delayed by previous beta therapy.

When corneal vessels are large and superficial, considerable radiation dosage and time can be saved by coagulation of the trunk vessels at the limbus, using the Hildreth or other convenient form of cautery, followed by beta irradiation to prevent recurrence.

Opacity due to scars cannot be cleared by irradiation, and in most cases of corneal vascularization the control of symptoms and the clearing of the corneal

haze are the objectives of beta therapy. It is therefore wise to proceed slowly with beta therapy and to discontinue it when symptomatic relief is obtained.

Corneal ulcers, phlyctenulosis, epithelial keratitis, stromal herpes and scleritis sometimes appear to respond favorably to low dosages, but results are variable and difficult to evaluate; moreover, they necessitate an extremely conservative attitude toward beta radiation as their treatment. Epilation for *trichiasis* has some limited use but requires great accuracy of administration, because of the close relation of permanent epilation and skin erythema dose.

Contraindications.—At present, the following conditions are considered contraindications to beta radiation therapy: corneal dystrophy, lupus erythematosus, ocular pemphigus, active infection or keratitis, sarcoïd, naevus, and, of course, other conditions for which beta therapy is simply inadequate or unnecessary, such as dermoids, pinguecula, preoperative pterygia, tumors too large or deep to treat, deep or silent vascularization of the cornea, and corneal scarring.

Administration.—Because of the advantages and convenience of the strontium applicator, it has almost replaced applicators using other source materials of similar depth dose. For very superficial use, the radium-D applicator reduces the lens hazard but is otherwise limited.

The various strontium applicators vary somewhat in design, but fundamentally they are similar. Recent models have proved to be easier to use than the older ones, because of a smaller active-face diameter and more potency.

Because of geometric variations and variations in the physical calibrations of beta applicators, dosages are calculated on the basis of applicator performance. In some cases this has been by r^2 but a more accurate method

PLATE LXX

- FIG 3 —Mouse 302 Young D Z male, untreated Normal adrenal after fixation in osmic vapour Low power
- FIG 4 —Mouse 565a Formol fixed adrenal of untreated normal mouse, mixed strain Frozen section viewed in dark ground, cortical lipoid bright, medulla dark High power
- FIG 5 —Mouse 565 Formol fixed adrenal of castrated male, mixed strain, treated with kotohydroxyæstrin for 7 months Frozen section viewed in dark ground, showing areas of brown degeneration as light masses lying between bright cortex and dark medulla High power
- FIG 6 —Mouse 169 Male, mixed strain, treated with a folliculin (Schering) for 5 months Section of adrenal fixed in osmic vapour showing isolated masses of brown degeneration around medulla High power

C = cortex M = medulla BD = brown degeneration CV = central vein
IC = lipoid cells CA = cortical adenoma

by the additional variable of applicator dose rate. It is true that beta applicators are calibrated by the manufacturer, but a fluctuating M.I.D. from one applicator to another would seem to indicate inaccuracies in the methods of calibration used in the past (Table 1).

The physical measurement of beta radiation has been a complex, difficult problem, ¹ for clinical purposes the need is for constancy of calibration rather than absolute accuracy. Table 1 indicates a definite trend toward a more nearly constant M.I.D. among some of the more recent strontium applicators. This is encouraging, and it may mean that physical methods of calibration will prove consistent enough to be clinically dependable. There is too much at stake, however, to accept this trend as fact until it is firmly

established, especially since physical calibration has been unreliable clinically in the past, and biologic standardization of each new applicator has proved to be an adequate safeguard in dosage calculations prior to its use on human eyes.

Complications.—In beta-irradiated ocular tissues, late changes, such as telangiectasis and keratinization of the conjunctival epithelium, atrophy of the sclera, keratitis, corneal scarring and thinning, iritis, iris atrophy, and radiation cataract have been discussed by several authors.² Except for conjunctival telangiectasis, which I have seen following 6,000 rep, but which can occur in some persons after dosages under 5,000 rep,² and also except for lens changes, to be discussed presently, the complications of beta radiation are the result of dosages that are frequent-

TABLE 2.—Clinical Indication and Dosages in Terms of Minimum Inflammatory Dose (M.I.D.).

Condition	Average Total Dosage		Comment
	M.I.D. Dosage Factor	Example for Applicator with M.I.D. of 20,000 REP.	
Benign neoplasms	0.15 M.I.D.	3,000 REP.	2-4 fractions after excised to base
Carcinoma, basal, squamous	0.20	4,000	Preliminary, superficial, subtotal irradiation in single fraction
Carcinoma, Bowen's	0.30	6,000	4-8 fractions for early, thin lesion, or excised to base
Chronic inflammatory tumor	0.10	2,000	Small, single fractions guided by response
Granulation tissue	0.10	2,000	One or two treatments
Phlyctenulosis	0.03	600	Only for most persistent lesions
Plaque, epithelial	0.25	5,000	Excised to base with 2-3 fractions postoperatively
Pterygium	0.15	3,000	Treat at 5 days and 30 days after operation
Scleritis	0.05	1,000	Treat symptoms only
Trichiasis	0.08	1,600	Epilation dose about equal to S.E.D.
Corneal ulcer	0.025	500	Better for more chronic types; use proximal spray technic
Vascularization, corneal	0.25	5,000	Superficial types only
Vernal conjunctivitis	0.09	1,800	Treat

SUMMARY

The indications for ophthalmic beta irradiation are few but definite. Many of the undesirable side-effects are due to overdosage, but some, e.g., lens opacities, are not necessarily due to this cause. Experimentally, however, some focal opacities have been nonprogressive for years; radiation cataract of clinical importance, therefore, may not be so great a danger as is indicated by the frequency of sector opacities. Nevertheless, until this point is better understood, and always because beta radiation is a destructive agent, great caution and conservatism should be exercised in its use.

RÉSUMÉ

Les indications de l'irradiation oculaire (rayons beta) sont peu nombreuses mais bien définies. Un grand nombre de complications sont dues à un sur-dosage; d'autres, telles les opacités lenticulaires, peuvent avoir une origine différente. Certaines opacités focales expérimentales sont restées stationnaires durant des années; la cataracte par irradiation peut donc n'être pas un risque aussi grand que l'indique la fréquence des opacités par secteurs. Il faut néanmoins faire preuve de la plus grande prudence dans l'emploi des rayons beta.

RESUMEN

Las indicaciones de la beta irradiación son pocas pero bien definidas en oftalmología. Muchos de los indeseables efectos secundarios han sido debidos a sobredosificación aunque algunos, como por ejemplo las opacidades del cristalino, no sean necesariamente debidos a esta causa. Sin embargo, experimentalmente, algunas opacidades focales han permanecido estacionarias

durante varios años; la catarata por irradiación, de importancia clínica, puede no constituir un peligro tan grande como se dice por la frecuencia de las opacidades parciales. No obstante, hasta que esta cuestión sea mejor conocida, y puesto que la beta radiación es un agente destructivo su uso debe hacerse con prudencia y gran precaución.

ZUSAMMENFASSUNG

Es gibt bestimmte wenn auch wenige Indikationen zur Anwendung von Betastrahlen bei Augenerkrankungen. Viele der unerwünschten Nebenerscheinungen sind auf Überdosierung zurückzuführen, manche wie z. B. Linsentrübungen sind jedoch nicht notwendigerweise dieses Ursprungs. Experimentell hat sich gezeigt, dass Herdtrübungen der Linse über Jahre hinaus keine Zeichen des Fortschritts aufwiesen; folglich sind klinisch bedeutsame Bestrahlungskatarakte vielleicht nicht so gefährlich wie man aus der Häufigkeit von Sektortrübungen annehmen könnte. Trotzdem ist grosse Vorsicht und Zurückhaltung in der Anwendung von Betastrahlen angezeigt, weil es sich um ein zerstörendes Mittel handelt und die oben erwähnten Komplikationen noch nicht klar verstanden werden.

SUMARIO

As indicações para o uso oftálmico das irradiações beta são poucas porém definidas. Muitos dos efeitos secundários indesejáveis são devidos ao uso de dose excessiva, existindo porém condições como opacidade da lente que não são necessariamente devidas a esta causa. Experimentalmente, entretanto, algumas opacidades focais mantiveram-se estacionárias durante anos. Catarata de irradiação de importância clínica não é um perigo tão grande

arise through enlargement of isolated lipid-containing cells, some of which become confluent, their contents being transformed into the characteristic brown material. Gradually the medulla becomes involved, sometimes, though more rarely, the outer layers of the cortex. The process of degeneration can be produced in both male and female mice of mixed strains by the prolonged application of oestrogenic hormones. We have seen it in such mice after five to six weeks' treatment (fig 9). As the treatment is prolonged the process becomes more extensive.

The lipid cells of the zona reticularis

In describing the early stages of brown degeneration, reference was made to isolated lipid-containing cells in the zona reticularis which seem to form the starting point of the process. These are rare in young mice, but are frequently present in adult mice, even when these have not been treated with oestrogenic hormones (fig 10). They have been figured previously in certain abnormal conditions (Cramer, 1928). These cells may increase in size and number as the animals get older, they may become closely packed with lipid globules which sometimes become confluent, staining black in osmic vapour preparations. Occasionally in older mice there is an indication of a transformation of the cell contents into the characteristic brown material. It is possible, therefore, that these lipid cells represent the very earliest stage of brown degeneration, which in mice of mixed strains does not proceed beyond this first stage, at any rate, during the first year. We have not yet examined a sufficiently large number of old mice of mixed strains to be able to say whether brown degeneration occurs spontaneously in old mice. So far brown degeneration has been found in only one mouse more than a year old.

THE ADRENALS OF MICE WITH SPONTANEOUS MAMMARY CARCINOMA

In the male and female mice of the genetically pure D Z strain with a high incidence of mammary cancer, brown degeneration, indistinguishable from that just described, sets in spontaneously. It is progressive and becomes more extensive with age, and we have found the process in an advanced stage in male mice of this strain aged one year or more (fig 8). The brown degeneration is always fully developed in the mice of the D Z strain before mammary cancer appears, that is to say in the females developing mammary cancer spontaneously and in the males developing mammary cancer after oestrin. Brown degeneration was also present in a female with spontaneous carcinoma of a mamma, belonging to another genetically pure strain with a high incidence

Ocular Tendon Transplantation: Indications, Variations and Technic

WILLIAM E. KREWSON III, M.D., F.A.C.S., F.I.C.S.

PHILADELPHIA, PENNSYLVANIA

BY operating on the extraocular muscles it is possible to create either of two effects; that is, to weaken or strengthen the mechanical purchase exerted by the muscles upon the globe. Weakening (or lengthening) procedures are: (1) tenotomy, (2) myotomy, (3) myectomy and (4) recession. Strengthening (or shortening) procedures are: (1) advancement, (2) tuck, (3) resection, (4) cinch and (5) transplantation.

Attention is herewith directed to the transplantation of ocular muscles. It is a method not commonly used and is regarded unfavorably by many surgeons. The fact that its use has proved disappointing in some cases is probably due to the fact that the procedure has definite limitations; when these are exceeded, poor results are inevitable. More important, perhaps, are the indications for its use, which must be observed rigidly.

Strictly speaking, surgical transplantation is not a strengthening procedure, but rather a substitution for the function of a paretic muscle accomplished by altering the direction of action of one or more other muscles. More specifically, the insertion, and also the point of contact, of a nonparalyzed muscle may be used so that the resulting effect will compensate for the action of the paralyzed muscle.

Transplantation has taken many forms and has been applied to all manner of

oculomotor disturbances. It has many advocates, but there are those who hold it in disdain. The fact that the method has been tried mostly in problem cases, probably in desperation, has contributed to this disparagement. The term is usually applied to various forms of substitution in the surgical treatment of paralysis of the lateral rectus muscle.

Operation for Paralysis of the Lateral Rectus Muscle.—Acquired abducens paralysis is characterized by convergent deviation, limitation of abduction and homonymous diplopia, which eventually may give way to suppression. In cases of long-standing paralysis, contraction of the antagonistic medial rectus muscle may develop, as well as a tendency to turn the head toward the affected side. Spontaneous recovery will occur in some cases, and therefore, before surgical intervention is considered, a reasonable period—six to twelve months—should be permitted for observation, especially if the origin of the paralysis is traumatic. When no improvement occurs during this interval, operation is indicated.

The object of surgical intervention, of course, is to establish parallelism of the visual axes in the primary position. If this result can be obtained and normal retinal correspondence is present, binocular single vision in this position is to be expected. When long-standing suppression has been established and then suddenly abolished by operation, however, diplopia of a most annoying type may result. Also, when contraction of the

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.

Submitted for publication Sept. 17, 1956.

PLATE LXXI

- FIG 7—Mouse 257 D Z female, aged 13 months, untreated Very advanced stage of brown degeneration extending into medulla and cortex Fixed osmic vapour High power
- FIG 8—Mouse 283 D Z male, aged 15 months, untreated Fixed osmic vapour Very advanced stage of brown degeneration, extending deeply into medulla but not into cortex Narrow bands of adrenalin containing medullary cells, filled with fine black granules, can be seen lying between the large masses of brown degeneration High power
- FIG 9—Mouse 425 Mixed strain, male, treated with ketohydroxyoestrin for 40 days Fixed osmic vapour Early stage of brown degeneration Two small centres of brown degeneration are seen lying in the reticularis, which is broad and congested High power
- FIG 10—Mouse 541 Old mixed strain, female, untreated Fixed osmic vapour Shows ring of lipid cells, filled with globules of lipid material lying in the zona reticularis High power

over the petrous portion of the temporal bone. Tendon transplantations were performed on each eye, resulting in a good cosmetic appearance with binocular single vision in the primary position and some ability to abduct the eyes.

REPORT OF CASE

Mrs. M. S., age 50, was first seen on Nov. 13, 1954. The patient was a victim of an automobile accident that had occurred on June 6. She had suffered a cerebral concussion with no fracture of the skull and had been unconscious for five days. On regaining consciousness she had diplopia, which had persisted; she was constantly dizzy, and was unable to walk in a straight line.

Examination revealed the uncorrected vision to be 6/5 in the right eye and 6/6 in the left. Both eyes were adducted, owing to paralysis of the lateral recti and contracture of the medial recti. The patient was unable to abduct either eye to the midline. Measurement of the tropia with loose prisms revealed the right eye to be adducted 60 prism diopters and the left 45 prism diopters. When fixing with the left eye the patient turned her face to the left, and when fixing with the right eye she faced to the right. Homonymous diplopia was constant and relieved only by occlusion of one eye. There was fair ability to elevate or depress the eyes, but this could not be measured, because of the marked adduction. Otherwise, the external appearance of each eye and both fundi was normal. The patient used alternate daily occlusion.

On Oct. 18, 1955, eleven months after the accident, the medial rectus of each eye was recessed to the equator, with no apparent improvement. This was followed on November 19 with a 10 mm. resection of the right lateral rectus and an 8 mm. resection of the left lateral rectus. Both muscles showed pronounced aplasia. Horizontal movement was improved, in that the patient could rotate the right eye outward to about 15 degrees, and the left eye outward to about 10 degrees, from the midline. Diplopia was relieved for the near point with a 9-diopter prism base out before each eye, but was constantly present beyond a distance of 10 feet.

On December 8 a transplantation was performed on the right eye and on December 15 on the left eye. In each instance the lateral two-thirds of the superior and inferior

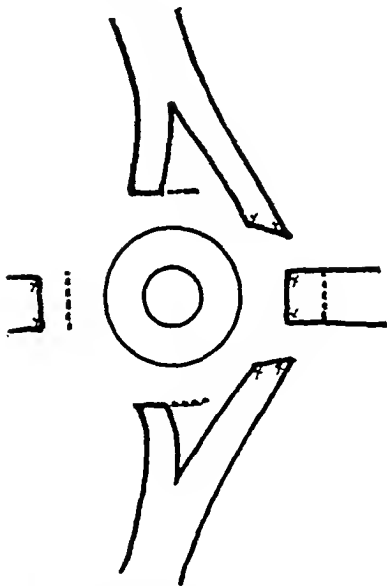


Fig. 2.—Left eye. After Hummelsheim, second stage: transplantation of lateral tendon slips of superior and inferior recti.

recti were transplanted to points on the sclera respectively just above and just below the point of insertion of the lateral rectus. At the same time the medial third of the superior and inferior recti were transplanted to points just lateral to the temporal edge of the respective muscle insertions. After this operation the patient experienced single binocular vision with a 1-diopter prism base down before the right eye, a 1-diopter prism base up before the left eye and, for distance, a 10-diopter prism, base out, before each eye.

On Jan. 31, 1956, a marginal myectomy of the right medial rectus muscle was performed on both the upper and the lower borders. This was followed on February 7 by the same procedure on the right medial rectus.

On April 16 all postoperative reactions subsided, and the patient was quite comfortable. Each eye could be rotated into the midline. The eyes were now abducting 10 degrees from the midline. The patient was now able to correct the diplopia.

tion (Fig. 4) as was done in this case. It is important when one reattaches the split portions of the tendon to have these flattened out so as to provide as wide an attachment as possible, with minimal reaction, and this may be accomplished better by the use of two separate sutures (Figs. 2, 3 and 4). Most writers state that the temporal portion of the superior rectus is transplanted to or beneath the point of insertion of the lateral rectus; but in my experience, in order to reach this point the muscle has to be put on a tremendous stretch, and for this reason I have been in the habit of attaching it just above the insertion of the lateral rectus.

The same procedure is performed on the inferior rectus muscle. Baldwin⁷ has suggested attaching the inferior tendon transplant slightly closer to the lateral rectus insertion than the superior tendon is inserted, in order to improve downward gaze, and I have found this helpful.

It is important not to split the tendon more than 10 mm. back from its detached end. The effective point of the new insertion, as was pointed out by Francois,⁶ is at the point of division of the two portions of the tendon; hence, the shorter the split, the more lateral and the more anterior is this new and effective insertion.

Final adjustment, if satisfactory abduction is not obtained, is effected by further recession or by marginal myotomy of the medial rectus. McLean⁸ suggested detaching the medial rectus, identifying it with loose sutures and reattaching it as necessary several days after the transplantation operation.

Complications.—The complications of transplantation are few. Most notable is a rather prolonged postoperative reaction. Occasionally slight enophthalmos has been noted, with accompanying narrowing of the palpebral fissure, but this usually does not last for more than a few days after

the operation. Temporary changes in the corneal astigmatism and folds in Descemet's membrane, apparently due to pressure of the muscles on the globe, have been reported also. Not infrequently a vertical muscle imbalance of small degree is produced; it can usually be overcome by means of vertical prisms incorporated in spectacle frames, as was necessary in the case presented.

COMMENT

The mechanism by which the operation accomplishes its purpose has been the subject of much debate. Spaeth² expressed the opinion that recession of the medial

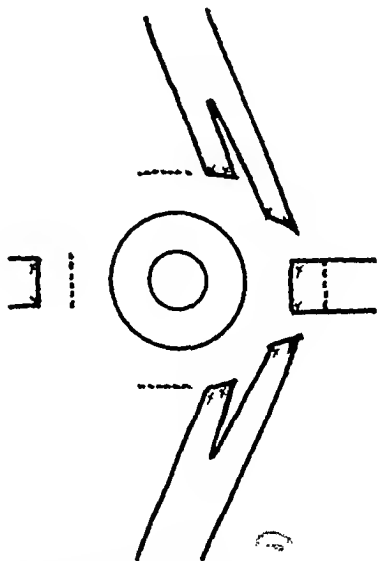


Fig. 4.—Left eye. Author's m
plantation of "infer" and inf
medial an
la,

como as indicações e contra-indicações. Analiza o mecanismo que explica os efeitos do tratamento cirúrgico.

ZUSAMMENFASSUNG

Es wird unter besonderer Berücksichtigung der Modifizierungen der Hummelsheimschen Operation die Stellung der Sehnentransplantation in der chirurgischen Behandlung des Schielens erörtert.

Ein Fall von doppelseitiger Abduzenslähmung, bei dem eine doppelseitige Transplantation mit dem Resultat normalen Sehens und Abduzierens beider Augen vorgenommen wurde, wird beschrieben.

Die chirurgische Technik des Verfassers wird wiedergegeben, und die Indikationen und Gegenindikationen ihrer Anwendung werden hervorgehoben.

Der für den Erfolg der Operation verantwortliche Mechanismus wird erörtert.

RESUMEN

Se discuten el lugar de las operaciones de transplante de tendones en el tratamiento quirúrgico del estrabismo, con especial mención de las modificaciones de la operación de Hummelsheim.

Se reporta un caso de parálisis bilateral del motor ocular externo tratado por operacioeves de transplante bilateral, habiéndose logrado visión binocular y movimiento de abducción.

Se describe la técnica quirúrgica del autor y se senalan sus indicaciones y contraindicaciones.

Se estudia el mecanismo por el cual actúa la operación.

REFERENCES

1. Lyle, T. K., and Cross, A. G.: Diagnosis and Management of Paralysis of the Extrinsic Ocular Muscles, *Brit. J. Ophth.* 35:511, 1951.
2. Spaeth, E. B.: Surgical Aspects of Defective ... *Ophth.* 49:49, 1953.
3. ... erfahrungen mit ... an den augen-muskeln, *Arch. f. Augenn.* 62:7, 1908.
4. O'Connor, R.: Tendon Transplantation in Ocular Muscle Paralysis, *Am. J. Ophth.* 18:49, 1953.
5. Berens, C., and Girard, L. J.: Transplantation of the Superior and Inferior Rectus Muscles for Paralysis of the Lateral Rectus, *Am. J. Ophth.* 33:7, 1950.
6. Francois, J.: Muscle Transplantation in the Treatment of Ocular Palsies, *Ann. d'ocul.* 188: 327, 1955.
7. Baldwin, G.: Surgery for Paralysis of the External Rectus Muscle, *E.E.N.T. Monthly* 26: 144, 1947.
8. McLean, J.: Communication in Spaeth, E. B., *Arch. Ophth.* 49:49, 1953.
9. Hildreth, H. R.: The Tendon Transplanting Operation, *Am. J. Ophth.* 36:1269, 1953.

Early diagnosis, once more, is the reward of a suspicious mind. Does a man who has eaten like a horse till the age of forty suddenly get indigestion, though his job, his habits, his wife remain the same? No! Does gastric ulcer start after forty? Never—well, hardly ever! Does the tired business man come back tired after a week at Westward Ho? Not if his tiredness is no more than business worries. These people want investigation before, not after, they start a course. diet and medication on the advice of the chemist, the man in the train, or the health column in the evening paper. The seller of alkalis is the und friend.

THE ÆTIOLOGY OF MAMMARY CANCER IN MICE OF MIXED STRAINS AND OF GENETICALLY PURE STRAINS

These considerations suggest that there may be differences between the ætiology of mammary cancer in mice of mixed strains and those of specially inbred strains with an inherited high susceptibility to mammary cancer. There are facts to support such a view. When mammary cancer develops in mice of mixed strains it appears as a rule in one mamma. When the animal is kept alive by removing the tumour before it has metastasised, the animal will frequently complete the natural span of its life without developing a second tumour in the remaining mammary glands. In mice of the inbred D Z strain the picture is quite different. Tumours frequently appear in one animal in two or even three mammary glands at the same time. If a tumour appears first in one gland only and is removed by operation, a second tumour will often appear in one of the remaining mammae, and if this is removed even a third carcinoma may develop in yet a different mamma. In mice of this inbred strain, then, which develop brown degeneration in the adrenals spontaneously, cancer of the mamma appears as a general disease with local manifestations, a disease which cannot be cured by operative removal of the tumour. In animals of the mixed strains, cancer of the mamma developing spontaneously appears as a local disease, curable by operation, as in the human subject.

It has been stated repeatedly in recent writings that the experimental investigation of cancer should be carried out exclusively in genetically pure strains. From certain points of view this has great advantages. But it also has the disadvantage that it distorts the clinical picture of the disease as it appears in man by emphasising one particular ætiological factor—the factor of susceptibility—to such an extent that the importance of the other ætiological factors is unduly minimised. If adrenal lesions are found in other genetically pure strains, it may indeed be questioned whether such highly inbred animals can be accepted as representing normal organisms.

THE SO-CALLED X ZONE AND ITS SIGNIFICANCE

A number of observers have described in the mouse adrenal a degenerative change which they believe to be a normal process corresponding to that seen in the human adrenal after birth (Tamura, 1926-27, Howard-Miller, 1927-28, Deanesly, 1928, Whitehead, 1931, 1932-33). The adrenal of the mouse in the first weeks after birth is said to consist of a medulla, a cortex and an intermediate, anatomically separate zone—the X zone. It is stated that the X zone disappears from males a few weeks after

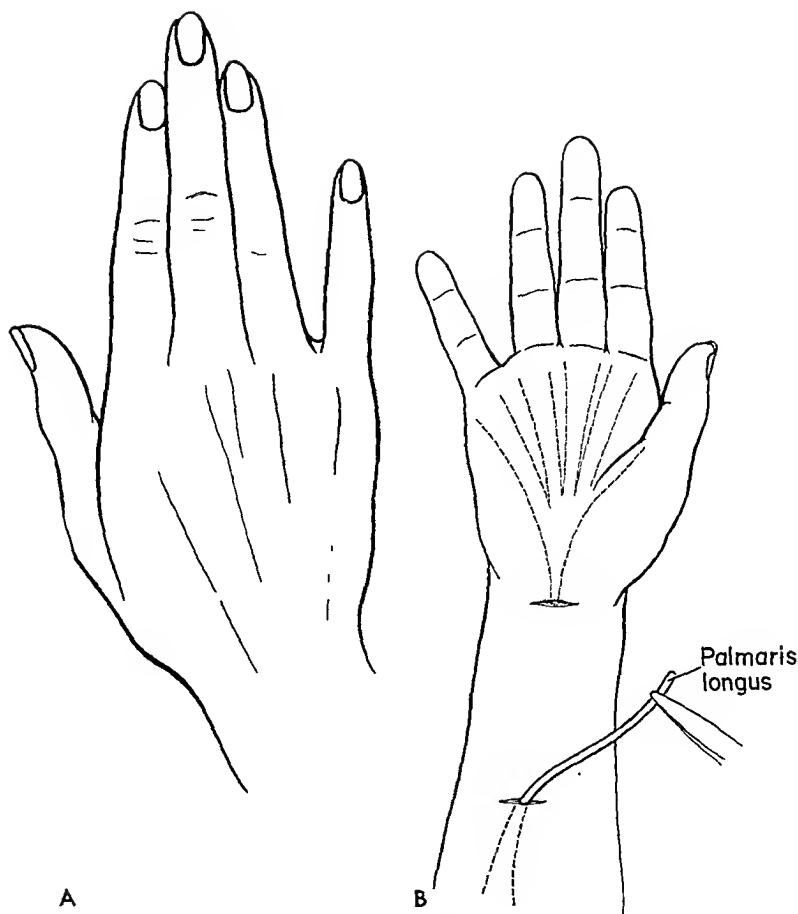


Fig. 1.—A, loss of ability to adduct the small finger or the ring finger; accentuated with digits held in extension. B, division and preparation of the palmaris longus tendon for a "free tendon graft."

tourniquet had been placed above the upper portion of the right arm. A small C-shaped incision was made over the right palm in the region of the distal palmar crease. Below the

skin, scar tissue, the injury, was encountered

netrating
as ex-
erve
ve

Unfortunately their statements on this point are uncertain. Only Howard-Miller indicates that her animal material was obtained from specially inbred strains. In any case the process of degeneration observed by them is not a transient physiological phenomenon which takes place regularly in the adrenals of normal mice. Whether it is a pathological and progressive one found only in abnormal animals or in special strains, and whether it is similar to or identical with the process of brown degeneration described by us, requires reinvestigation by more adequate methods.

SUMMARY AND CONCLUSIONS

A process of brown degeneration occurring in the adrenals of mice of both sexes is described for the first time. It occurs in normal mice of mixed strains after the prolonged cutaneous administration of certain oestrogenic hormones. It takes place spontaneously in mice of both sexes of a highly inbred strain—the D Z strain—with a high incidence of spontaneous mammary cancer in the females.

The relationship of brown degeneration to the aetiology of mammary cancer in mice is discussed. It is pointed out that this process represents a difference, demonstrable anatomically, between an inbred strain with a high incidence of mammary cancer and mixed strains with a low incidence. Observations on the adrenals of mice from other inbred strains with a high incidence of mammary cancer are necessary to determine whether the existence of the adrenal lesion can be associated aetiologicaly with a susceptibility to mammary cancer. It is pointed out that the aetiology of mammary cancer in the inbred strain studied by us differs from the aetiology of mammary cancer in mixed strains with a low incidence. In the former, spontaneous mammary cancer appears as a general disease with local manifestations which cannot be cured by operation, in the latter as a local disease curable by operation. The spontaneous occurrence of a pathological lesion in the adrenals in a genetically pure strain raises the question whether the animals of such a strain can be regarded as normal.

REFERENCES

- | | | |
|-----------------------------|------|--|
| BURROWS, H | 1935 | this <i>Journal</i> , LI 423 |
| " | 1936 | this <i>Journal</i> , LIII 121 |
| CRAMER, W | 1918 | 19 <i>J. Physiol.</i> , LI <i>Proc. Physiol. Soc.</i> , p. viii |
| " | 1928 | Fever, heat regulation, climate and the thyroid-adrenal apparatus
<i>London</i> , pp. 16-18 |
| CRAMER, W, AND HORNING, E S | 1936 | <i>Lancet</i> , I 247 |
| DEANESLY, R | 1928 | <i>Proc. Roy. Soc., B</i> , CIII 523 |

and the skin sutures and plaster cast were removed on the twenty-first postoperative day. After extensive physiotherapy consisting of whirlpool and rubber ball exercises, the patient regained 80 per cent of total functional adduction of the right little finger, and the deformity was minimal.

SUMMARY

A case is reported, and the surgical technique employed for a tendon transplant (to correct loss of adduction of a digit because of irreparable destruction of a motor nerve to the intrinsic muscle of the hand) is described. The end result so compensated for the original deformity as to furnish abundant justification for surgical intervention.

RÉSUMÉ

L'auteur décrit la technique chirurgicale utilisée dans un cas de transplantation tendineuse (correction de la perte de l'adduction par destruction d'un nerf moteur du muscle intrinsèque de la main). Le résultat obtenu a pleinement justifié l'intervention chirurgicale.

ZUSAMMENFASSUNG

An Hand eines Krankheitsfalles wird die hier angewandte chirurgische Technik einer Sehnen transplantation beschrieben, die vorgenommen wurde, um den durch irreparable Zerstörung eines motorischen

Nervens der inneren Handmuskeln bedingten Adduktionsverlust eines Fingers auszugleichen. Der chirurgische Eingriff wurde durch die erfolgreiche Kompensierung der Entstellung in hohem Masse gerechtfertigt.

RIASSUNTO

Viene descritto un caso in cui si eseguì un trapianto tendineo per correggere la perdita di adduzione di un dito causata dalla distruzione del nervo motore. Il risultato definitivo fu così soddisfacente da giustificare l'intervento.

RESUMEN

Se reporta un caso y se describe la técnica quirúrgica empleada para transplantar un tendón para corregir la pérdida de la adducción de un dedo debida a destrucción irreparable de un nervio motor de los músculos intrínsecos de la mano. El resultado final justifica la intervención quirúrgica.

SUMARIO

Apresenta um caso de transplante de tendão, descerevendo a técnica para corrigir a perda de adducção do dedo por destruição irreparável do nervo motor da musculatura intrínseca da mão. O bom resultado final compensa e justifica abundantemente a intervenção cirúrgica.

"Why are you in such an everlasting hurry?" people are always saying to me . . . You eat, drink, walk and even sleep as if you were in a rush to get somewhere for fear of dying before you reach it! They do not understand that I run not to but away.

—Anonymous

sections require no further treatment for microscopic examination. After dissolving the paraffin in xylol the sections are mounted in Canada balsam. If it is desired to remove the lipoids from the cortex so as to emphasise the distinction between cortical and medullary cells the sections are placed in a suitable impure (commercial) turpentine for half an hour. Some pure turpentine preparations do not dissolve the lipoids. It is also possible to remove all the reduced osmic acid from the preparation by immersing it for 15 minutes in a solution of 3 parts of 80 per cent alcohol and 1 part commercial solution of hydrogen peroxide (20 vols). The preparation can then be stained with the ordinary histological stains, Heidenham's iron alum hæmatoxylin being very suitable.

In the seventeenth and eighteenth centuries, Willis of England, Duverney of France and Valsalva of Italy are but a few to whom we owe so much. It was during this period that some of the earliest surgical procedures for relief of deafness were described. Paracentesis of the tympanic membrane was employed for the relief of deafness long before it was advised as a means of facilitating drainage of the middle ear. Similarly, mastoidectomy was recommended as a cure for deafness and tinnitus long before it was accepted in the treatment of mastoiditis.

The nineteenth century brought with it certain refinements in otologic knowledge. Corti emphasized histologic study and was the first to describe the cochlea in detail. It was during this period that the French, German and English schools of otolaryngology contributed so many of the great names that have become bywords. Among these must be mentioned Helmholtz, Weber, Rinne, Yearsley, Toynbee, Wilde and Politzer.

Modern Concepts of the Surgical Treatment of Deafness.—The successes attained in present-day operations for deafness are due not only to the otolaryngologic tradition of knowledge and experience but to the many advances in modern science. Refinements in audiologic testing provide greater accuracy in choosing candidates for surgical treatment; new technics in roentgenography make possible the visualization of anatomic regions and pathologic entities heretofore not recognized; the use of the magnifying loupe and the operating microscope enables the surgeon to devise technical procedures never before possible; modern chemotherapeutic agents and antibiotics help immensely in the successful completion of operations that were formerly defeated by secondary infection.

Deafness in general can be divided into four main categories: nerve deafness;

conduction deafness and a combination of the two, known as mixed deafness and central deafness. Nerve deafness involves the neural elements of hearing and may occur in the end organ of hearing, in the nerve pathways to the brain or in centers in the brain itself. The deafness that occasionally follows mumps or meningitis is an example of the pure nerve type of deafness. By contrast, the hearing loss of patients with otosclerosis is a result of impairment of the sound-conducting mechanism alone and is therefore classified as conduction deafness. It is not uncommon for nerve deafness to coexist in a patient with conduction deafness (the so-called mixed deafness). This is illustrated by the patient with conduction deafness due to chronic disease of the middle ear in whom further hearing loss results from damage to the auditory nerves associated with aging. Central deafness occurs as a result of injury, disease or maldevelopment in the auditory centers of the brain itself. The clinical result is inability to perceive and recognize sound in a normal manner despite the fact that audiometric responses are apparently normal.

Accurate diagnosis of the type of deafness present is extremely important, since surgical treatment is employed only for those patients in whom disturbance of the sound-conducting mechanism is the sole or major cause of the hearing loss. At the time of writing, no known surgical procedure can restore or improve hearing in a patient with nerve deafness or central deafness. For such a patient a properly fitted hearing aid of the right type, instruction in lip reading and auditory training can do much to ameliorate the affliction.

Among the disease :
conduction deafness ..
treatment are (1 ..
tissue ..
(2) ..

killed bacilli (Rich, 1929, Weinzirl and Thayer, 1930-31, Rich, Jennings and Downing, 1933, Derick, Branch and Crane, 1935), or living avirulent bacilli (Willis, 1928), lost their hypersensitiveness to an intracutaneous injection of these agents, but not their immunity to virulent infection. The same has been shown in infected animals which after prolonged treatment with tuberculin lost the tuberculin hypersensitiveness but not the immunity to virulent reinfection (Fernbach, 1932, Boquet, 1933, Rothschild, Friedenwald and Bernstein, 1934). An indirect proof of the dissociation of hypersensitiveness and immunity has been recently given by demonstrating that after intradermal reinfection of tuberculous animals with minute quantities of bacilli the absence of any local sign of hypersensitiveness (such as Koch's phenomenon) does not preclude immunity to reinfection (Nasta, 1935, Dahl, 1936). On the other hand, hypersensitiveness produced by injection of acid-fast saprophytes or pure tuberculo-protein was not followed by immunity to virulent infection (Boquet, 1932, Seibert, 1932-33).

Despite this evidence that immunity is not necessarily produced by or combined with hypersensitiveness, the statement that both phenomena are in a causal relationship is not infrequently met with in the literature. An enquiry into this question with special regard to the influence of treatment with non-specific agents on hypersensitiveness and immunity seemed therefore desirable.

In the present investigation intracutaneous inoculation was uniformly employed to infect guinea-pigs, which had been previously treated with the various agents, in order to facilitate the recording of (a) the reaction at the site of infection, (b) the response of the regional lymphatic glands, including the time of their first appearance and disappearance, their anatomical character and the intensity of their reaction as compared with the non-treated but infected controls, (c) the result of the intracutaneous tuberculin reaction and (d) the extent of the visceral tuberculosis a certain period after infection.

I Experiments on animals treated with heat-killed bacilli suspended in saline

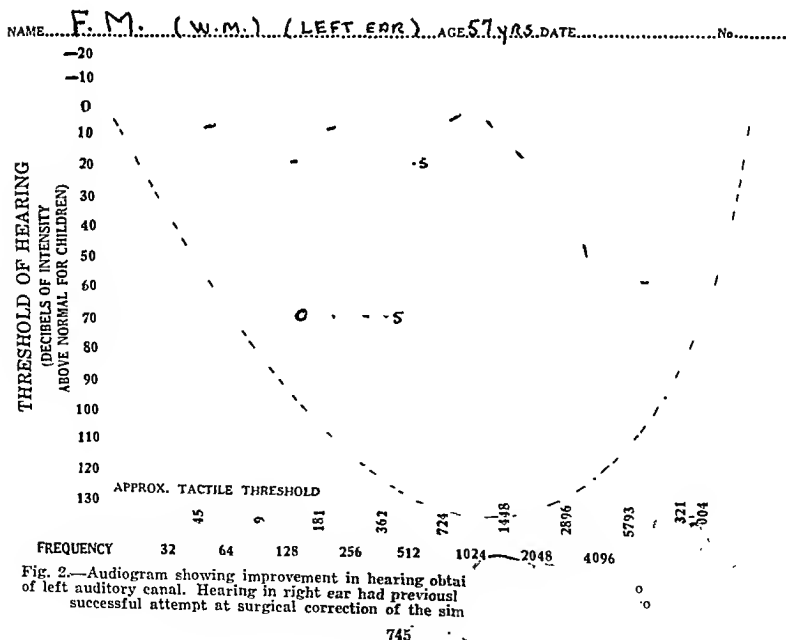
Vaccination was performed by giving 8-10 intraperitoneal injections at weekly intervals of 1 c.c. of a suspension containing 1 mg. of virulent human tubercle bacilli (killed by sterilisation for half an hour at 15 lb. pressure) in 2 c.c. of saline. Six weeks after the last injection the guinea-pigs were infected intracutaneously with 0.001 mg. of a virulent human (sputum) strain of tubercle bacilli ("Rule"). In the majority of the animals 3-5 doses of vaccine were also given after infection. An equal number of normal

of the anatomic structures in the middle ear spaces that conduct sound to the inner ear. The clinical manifestations include: (a) destruction of portions or all of the tympanic membrane; (b) necrosis of portions or all of the auditory ossicles; (c) formation of aural polyps and granulation tissue in the middle ear spaces; (d) cholesteatomatous invasion of the epitympanic space and mastoid process, and (e) formation of scar tissue involving the oval and round window areas.

The primary aim of the surgeon is to eradicate the underlying infection; his secondary aim, to utilize reparative technics to improve the hearing. The basic surgical procedures employed in removing infection are (1) modified radical mas-

toideotomy and (2) radical mastoidectomy. In modified radical mastoidectomy an attempt is made to eliminate infection and at the same time preserve, in whole or in part, the integrity of the ossicular chain. Radical mastoidectomy includes no effort to preserve the ossicles and is designed to convert the middle ear and mastoid cavity into one epithelium-lined cavity.

The reparative technics utilized to improve hearing in patients with chronic disease of the middle ear and mastoid are designed to compensate for disturbance of the normal conducting mechanism of the middle ear by the disease. At present there is no satisfactory substitute for ossicles that have been destroyed by disease or removed by operation. The gap in the



time when the first signs of a reaction at the site of infection developed in the controls. In the latter a papule appeared about the 15th day after infection, with subsequent ulcer formation, this was not visible in any of the treated animals.

Thus we see the characteristic picture of intersecting curves: the vaccinated and surviving animal responds immediately although not intensely to infection, the reaction abating or disappearing when the first signs of response become visible in the control animal. In the latter the reaction gradually increases to an intensity never reached in the treated guinea-pig.

Regional lymphatic glands There was no glandular reaction in 10 of the 12 treated and surviving animals, the remaining 2 developing a swelling of the regional gland 3×1 cm. All the control animals, however, showed diffuse caseation of the lymphatic glands reaching a size of 4×1 cm. at about the 36th day after infection, the first glandular reactions being observed at about the 15th day (as against the 30th day in the 2 treated animals with glandular reaction).

Tuberculin skin reaction Six of the vaccinated and surviving animals became tuberculin hypersensitive (to 0.1 c.c. of a 1 in 10 solution of old tuberculin) before infection. The tuberculin hypersensitiveness disappeared soon after infection, persisting for a short period in 3 of the animals only.

Visceral tuberculosis in the treated and surviving animals When killed 3 months after infection, 10 out of the 12 animals proved entirely protected and the 2 guinea-pigs which had developed glandular reactions at the site of infection showed slight lesions in spleen and liver, less in number and smaller in size than those of the controls. It is noteworthy that among the 10 entirely protected animals only 4 had become tuberculin positive during vaccination. On the other hand, both of the animals with slight visceral tuberculosis reacted to tuberculin during vaccination.

From this experiment the following conclusions may be drawn: (1) Immediate reaction after virulent infection does not imply protection from it. (2) Protection occurs independently of the quality of the immediate reaction (i.e. without impetuous inflammatory response including scab formation). (3) Positive tuberculin reaction previous to infection is not indispensable for protection, the latter may be absent in animals tuberculin hypersensitive before infection.

II *Experiments on animals treated with heat-killed bacilli suspended in glycerol peptone broth*

Twenty-three animals were treated with the vaccine in the way described, the heat-killed bacilli being suspended in glycerol peptone broth instead of in saline solution. Twenty of these

ian tube is present, however, surgical treatment of the associated atresia of the auditory canal does not improve the hearing.

Surgical correction of atresia of the auditory canal is designed to create a new auditory canal, but, because of the coexistent deformities in the middle ear, the hearing improvement brought about by this procedure alone often fails to bring the hearing up to a serviceable level.

With the addition of fenestration, performed at the same time the new auditory canal is created or later (two-stage technique), hearing levels well within serviceable range can frequently be obtained.

Because of the hazard of injury to the facial nerve in this type of operation, it is advisable that the operation be performed only when the congenital defect is bilat-

eral.

Noncongenital bony atresia of the auditory canal is relatively infrequent. In some instances the cause is unknown; in others the condition is an aftermath of trauma. When it occurs bilaterally, the impairment in hearing may be severe. Removal of the obstructing bony growth permits the return of normal hearing (Fig. 2).

4. *Surgical Treatment of Deafness Caused by Otosclerosis.*—The present-day treatment of deafness caused by otosclerosis forms one of the brightest chapters in the entire history of otolaryngology. Although this curious and baffling disease has long been known to otolaryngologists, it is only within the past twenty-five years that operation for deafness has been successful. The following passage is translated from the writings of Valsalva, re-

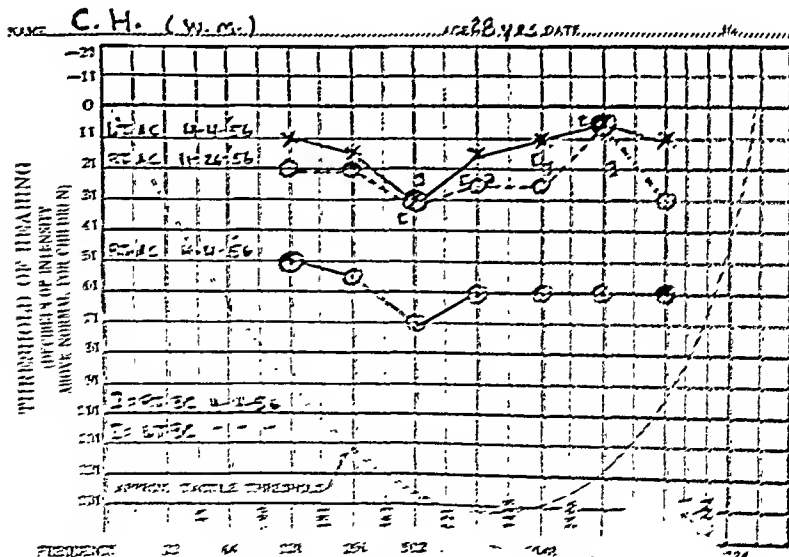


Fig. 2. Conductive hearing impairment at 5

Lymphatic gland In 7 of the 20 surviving animals there was no glandular reaction at all, while every control animal showed, 36 days after infection, swelling and caseation of the regional lymphatic gland approximately 3×1 cm in size. Twelve of the remaining 13 treated animals developed between the 8th and 30th day a palpable gland 5×2 mm in size which disappeared between the 18th and 40th day after infection, whereas in the controls the glandular tumours persisted until the animals were killed 3 months after infection. There was only one among the treated animals which exhibited a lymph glandular reaction almost identical with that of the controls. It was one of those without any local reaction at the site of infection.

Tuberculin hypersensitiveness Four guinea-pigs developed tuberculin hypersensitiveness during vaccination, which disappeared about 4 weeks after infection. Nine animals gave consistently a negative tuberculin reaction, 5 a positive reaction only once about 4 weeks after infection. A persistent positive reaction was observed in the animal mentioned above, with progressive caseation of the gland, and in a second guinea-pig without any local reaction at the site of infection.

Visceral tuberculosis Nineteen out of the 20 animals were entirely protected. The remaining guinea-pig with caseation of the gland regional to the site of infection, showed, when killed 3 months after infection, a few partially liquefied pulmonary foci and some in the spleen, i.e. much less than the controls. The tuberculin hypersensitiveness did not give any information as to the degree of protection, because one of the protected animals yielded a consistently positive test in the same way as the non-protected guinea-pig.

As to the relationship between hypersensitiveness and immunity, the following conclusions may be drawn: (1) Immediate reaction at the site of infection is not indispensable for immunity. (2) Peptone broth as excipient of the vaccine increases immunity and lowers hypersensitiveness. (3) Tuberculin hypersensitiveness is no indication of the production of immunity.

III *Experiments on animals treated with heat-killed bacilli suspended in glycerol peptone broth (10 times heavier infection)*

In a further experiment (table III) 18 guinea-pigs vaccinated with heat-killed tubercle bacilli suspended in peptone broth were infected with a ten times stronger dosage of bacilli (0.01 mg of the human strain "Rule").

Site of infection Thirteen animals, though reacting immediately after infection, developed a primary lesion almost identical with that of the controls, scab and ulcer formation being very marked in all of the animals except 5.

tion and stapes mobilization surgery, what shall be the advice given to patients seeking relief from deafness due to otosclerosis? Many factors enter into the final decision. A normal uncomplicated fenestration requires hospitalization for seven to ten days, a convalescent period of four to six weeks and prolonged after-care of the exenterated mastoid cavity. By contrast, the patient undergoing mobilization of the stapes is hospitalized for one to two days, the convalescent period is normally about one week, and relatively little post-operative care of the ear is required.

In a patient with successfully mobilized stapes, the level of improvement attainable is usually higher than that in a patient with a successfully fenestrated ear, because the ossicular chain is left intact. The possibility of a greater gain in hearing through mobilization of the stapes than is obtainable by fenestration also justifies mobilization of the stapes in patients for whom fenestration might be considered unsuitable.

For these reasons, it is the consensus of most otologists who perform fenestrations that mobilization of the stapes should be tried first; if mobilization cannot be achieved, the patient should be prepared to undergo fenestration within three to four months. In other words, mobilization of the stapes should be considered one phase of the effort to improve the hearing by surgical means.

SUMMARY

The status of present-day surgical therapy for deafness may be summarized as follows:

1. The surgical approach is applicable only to patients in whom disturbance of the sound-conducting apparatus is the sole or major cause of the hearing loss.

2. The major pathologic states producing conduction deafness amenable to sur-

gical treatment include (a) hypertrophied lymphoid tissue of the oropharynx and nasopharynx; (b) infection in the middle ear and mastoid process; (c) congenital or acquired atresia of the external auditory canal, and (d) otosclerosis with stapedial ankylosis.

3. Surgical procedures employed to alleviate deafness include (a) removal of lymphoid tissue of the oropharynx and nasopharynx; (b) modified and radical mastoidectomy with skin grafts; (c) in patients with atresia, creation of an external auditory canal; (d) fenestration, and (e) mobilization of the stapes.

ZUSAMMENFASSUNG

Der heutige Stand der chirurgischen Behandlung der Taubheit lässt sich folgendermassen zusammenfassen:

1. Chirurgische Behandlung lässt sich nur bei solchen Kranken anwenden, bei denen Störungen des Schalleitungsapparates die einzige oder wesentliche Ursache des Hörverlustes darstellen.

2. Zu den bedeutenderen Leitungstaubheit verursachenden Krankheitsveränderungen, die chirurgischer Behandlung zugänglich sind, gehören a) Hypertrophie des lymphatischen Gewebes im Mund- und Nasenrachen, b) Infektionen des Mittelohrs und der Warzenfortsätze, c) angeborener oder erworbener Verschluss des äusseren Gehörgangs und d) Otosklerose mit Steigbügelankylose.

3. Zu den zur Behebung von Taubheit angewandten chirurgischen Verfahren gehören a) Entfernung des lymphatischen Gewebes des Mund- und Nasenrachens, b) modifizierte oder radikale Warzenfortsatzresektion mit Hautplastiken, c) Schaffung eines offenen äusseren Gehörganges bei Kranken mit Verschluss des Mittelohrs, d) Fensterung und e) Mobilisation des Stapes.

immunity against tuberculous infection In further experiments I have therefore examined the influence of treatment with peptone broth alone on the course of a tuberculous infection 0.5-2 c c of 1 per cent peptone glycerol broth or of a concentrate of this solution to 1/5th of the volume by evaporation were injected intraperitoneally once a week for 6 to 10 weeks In some animals 3-6 further injections were given after infection (table IV)

TABLE IV

Effect of plain peptone broth on weak and heavy infections

Animals	No	Primary lesion, 10 days	Primary lesion, 19 days	Lymph gland reaction.	O T + persistent	Visceral tuberculosis		
						Protection	++	++++
Treated + weak infection	36	20 neg 16 = controls	20 trace 16 = controls	9 < controls 27 = controls	31 (+5 once doubtful)	4 complete 4 nearly	9	19
Controls weak infection	20	White papule	Scab and ulcer	4 × 1 cm	20	0	0	20
Treated + strong infection	8	8 = controls	8 = controls	6 < controls	1	2	4	2
Controls strong infection	10	Red papule	Scab and ulcer	4 × 1 cm	10	0	0	10

Primary lesion Out of 36 animals weakly infected with 0.001 mg of the human strain "Rule," 16 did not show any noticeable difference in the reaction at the site of infection from that of the controls, scab formation being even more accentuated in the treated guinea-pigs In 20 of the treated animals, however, after 10 days there was no primary lesion at all and after 19 days a slight papule only, whereas every one of the 20 controls showed a white papule 9 days and scab and ulcer formation 19 days after infection (chart 3) Thirty-two days after infection there was no trace of reaction left in the treated animals though the controls still showed a scab In 3 of the treated animals with retarded reaction a large cutaneous infiltration with no tendency to liquefaction and ulceration developed at the site of infection

In a second group of 8 guinea-pigs infected with ten times the dose given to the animals of the foregoing series (table IV), there were no differences between the treated animals and the controls in the reaction at the site of infection (chart 4)

Lymphatic gland In 9 out of the 36 weakly infected guinea-pigs treated with glycerol peptone broth the glandular lesion was much

auditivo; d) otoesclerose com ancilose do estapédio.

3. O tratamento cirúrgico, utilizado para aliviar a surdez inclui: a) excisão do tectí-lo linfóide; b) mastoidectomia conservadora ou radical com enxertos de pele; c) nos doentes com atresia formação de neocanal auditivo; d) fenestração; e) mobilização do estribo.

REFERENCES

1. Stevenson, R. S., and Guthrie, D.: A History

of Otolaryngology. Baltimore: The Williams and Wilkins Company, 1949.

2. Juers, A. L.: Preservation of Hearing in Surgery for Chronic Ear Disease, *Laryngoscope* 64: 235-251 (April) 1954.

3. Wullstein, H.: Theory and Practice of Tympanoplasty, *Laryngoscope* 66:1076 (Aug.) 1956.

4. Lempert, J.: Improvement of Hearing in Otosclerosis—A New One-Stage Surgical Technique, *Arch. Otolaryng.* 28:42, 1938.

5. Rosen, S.: Palpation of Stapes for Fixation, *Arch. Otolaryng.* 56:610-615 (Dec.) 1952.

6. Symposium: The Operation for the Mobilization of the Stapes in Otosclerotic Deafness, *Laryngoscope* 66:729-784, 1956.

IMPORTANT NOTICE TO ALL PARTICIPANTS IN CONGRESSES AND REGIONAL MEETINGS

Those desiring their Congress presentations to appear later as articles in the *Journal of the International College of Surgeons*, please note:

1. A full copy of the manuscript, together with all illustrations, legends, tabular matter and bibliographic references, should be sent DIRECT to the Editorial Office, *Journal of the International College of Surgeons*, 1516 Lake Shore Drive, Chicago 10, Illinois. Manuscripts so submitted will be promptly acknowledged and, on acceptance by the Editorial Board, published as soon after the Congress as possible. The *Journal* cannot be held responsible for loss, failure of acknowledgment, delay in publication or nonpublication of any manuscript, or any subsidiary material appertaining thereto, which has not been submitted through the official editorial channels.

2. Manuscripts may be submitted in advance of the Congress if desired. When this is done, they should be plainly marked with the name, place and date of the Congress or Meeting concerned, to guard against premature publication.

3. Manuscripts delivered in person to Congress officials or others for press reportorial use only should be sent by the recipient to the Public Relations Bureau.

4. If illustrations are desired and it is impossible to submit them at the time the manuscript is submitted, the notation "Illustrations to come" should accompany the latter; otherwise the article may be scheduled for publication before the illustrations have arrived.

These requests are made not only to safeguard the *Journal* from error but in the best interests of our contributors. To make sure of prompt acknowledgment and efficient handling of your Congress presentation, please send it DIRECT to its ultimate destination!

Visceral tuberculosis In the group of 36 weakly infected animals, 4 proved entirely and 4 almost entirely protected, in 9 there were fewer lesions and in the remaining 19 almost the same number of lesions as in the controls (figs 1 and 2). Among the 8 more heavily infected animals 2 were completely protected, 4 had fewer lesions, 1 almost the same number and 1 a larger number than the controls (fig 3). This last animal displayed an unusual form of tuberculosis with gross liquefaction in the spleen (fig 4).

The tuberculin hypersensitiveness as compared with the extent of visceral tuberculosis in these animals is of special interest. The two guinea-pigs with tuberculous lesions of the same or even greater extent than those of the controls gave a positive reaction once only (4 weeks after infection). Thus there was no relationship between tuberculin reaction, extent of visceral tuberculosis and protection against tuberculous infection. Evidence that hypersensitiveness to broth accounted for the irregular results of the tuberculin test could not be adduced, because the animals of both series had become hypersensitive to glycerol broth and yet their tuberculin tests differed.

Thus it appears that treatment with pure peptone broth can influence the course of experimental tuberculosis in the following ways: (1) It produces retardation and diminution of the reaction at the site of infection. (2) It causes diminution of the visceral tuberculous lesion and even complete protection of some animals, though less in number than those protected by treatment with heat-killed bacilli. In contradistinction to the effects of vaccination with heat-killed bacilli this protective influence is also obtained after a comparatively heavy infection. (3) Tuberculin hypersensitiveness has no bearing on the result of the treatment. It may be strong in cases of protection and weak in those of generalised tuberculosis.

V *Experiments on animals treated with heat-killed bacilli suspended in mixtures of peptone broth and active human serum*

In an additional series (table V), 16 animals were injected intraperitoneally on about ten occasions with 1 c.c. of a suspension of heat-killed bacilli in a mixture of equal parts of peptone broth and active human serum, and then infected in the same way as the animals in series III.

Lesion at the site of infection In contrast to the animals vaccinated with a simple saline suspension of heat-killed tubercle bacilli there was no immediate reaction after infection, the primary lesion being identical with the controls in 10 animals, and less than the controls in 5. In 1 animal no primary lesion was visible.

Lymphatic glands In 13 animals the glands regional to the



Fig. 1.—A, bad position of scar over tibia. B, free skin graft to close wound. C, extensive cross leg flap. D, flap from opposite thigh. E, partial flap loss of flap. F, delay of flap. Perforating vessels should not be damaged.

When the tissues of the leg adjacent to the defect are healthy, the operation of choice is a double-ended pedicle flap, preferably with use of the skin of the lateral surface of the leg. This flap is recommended for its simplicity, its dependability and the relative shortness of the time required when one adheres to certain funda-

mental principles. I have had some difficulties with this flap; in my opinion, the circulation should be tested by a delaying operation, since one has no sure method of determining what damage was done to the blood supply at the time the bones of the leg were fractured. On 3 occasions a simple delay of the flap has resulted in some



Fig. 2.—A, B and C, repair of extensive defect with exposed bone and metal plate by shift of adjacent tissue after delay operation.

PLATE LXXIII

- FIG 1 —Complete protection after treatment with peptone broth alone Spleen on right of treated, on left of control animal
- FIG 2 —Diminution of visceral tuberculosis after treatment with peptone broth alone 388, 390 and 381 are average spleens of treated animals, 405 is that of an average control
- FIG 3 —Aggravation of visceral tuberculosis after treatment with peptone broth alone On right side of picture lung and spleen of a treated animal, left, of average control
- FIG 4 —Spleen of treated animal cut, showing large foci and gross liquefaction
- FIG 5 —Aggravation of tuberculosis after treatment with heat killed bacilli suspended in a mixture of human serum and peptone broth Right lung, spleen, liver of treated animal, left, control

Proctologic Surgery

Further Experiences with Hyaluronidase in Anorectal Surgery

HENRY C. SCHNEIDER, M.D., F.A.C.S., F.I.C.S.

PHILADELPHIA, PENNSYLVANIA

LOCAL anesthesia by perianal infiltration of procaine is probably the safest for surgical treatment of the lower part of the rectum and the anus. Except for an occasional patient who is elderly or a poor risk, however, this method has not been widely used for routine anorectal procedures because of a number of deterrents, principally (1) inadequacy and insufficient duration of anesthesia, (2) distortion of the tissues at the site of injection, (3) exquisite pain caused by the injection until the anesthetic takes effect and (4) increased risk of infection. It appeared, therefore, that some method to facilitate diffusion of the anesthetic solution in the subcutaneous tissues was necessary, not only to increase the efficiency of the local analgesia but to obviate the other undesirable factors that have limited the popularity of local anesthesia for proctologic operations.

Since 1942, when Consentino¹ and Duran-Reynals² first suggested the addition of hyaluronidase to local anesthetic solutions, a great deal has been learned about the pharmacologic properties and clinical uses of the substance.

The principal advantage of the use of hyaluronidase as an adjunct to local anesthesia is that the enzyme hydrolyzes hya-

luronic acid ("ground substance" present in the interstices of the tissues), thus promoting rapid diffusion of the anesthetic solution. The rate of spread is proportionate to the amount of the enzyme used, and the extent is proportionate to the volume of the fluid injected.

Obviously, it is necessary to add a vasopressor to the hyaluronidase-anesthetic mixture; otherwise the solution would continue to spread, and the duration of anesthesia would be shortened.

During the past four years I have performed routine anorectal operations with the area under anesthesia, using hyaluronidase* with 1 per cent procaine. Various vasopressor drugs were employed in the anesthetic-hyaluronidase mixture; 3,4-dihydroxynorephedrine** in 5 cc. ampules of 0.1 per cent solution was found most satisfactory. (This is a local vasoconstrictor that produces less general increase in blood pressure than do other and similar compounds.)

A preliminary series of 357 patients, operated upon with local infiltration anesthesia, was described in November 1954.³ I have continued to use the same technic routinely in my practice, and now at the time of writing, four years after initiating the method, the series totals 1,200 anorec-

Read at the Twenty-First Annual Congress of the United States and Canadian Sections, International College of Surgeons, Chicago, Sept. 9-13, 1956.

Submitted for publication Sept. 19, 1956.

*Hyaluronidase is available as Wydase® (lyophilized stabilized solution) from Wyeth. One unit is equivalent to the T.

**Cobefrin® (Winthrop-St

ated upon immediately with no alteration of the usual methods. It may frequently be advantageous also to administer the anesthetic-hyaluronidase solution therapeutically to reduce edema for easier replacement of protrusions when operation is not feasible. Patients with this condition show a surprising improvement after such treatment.

5. *Cleavage planes are readily delineated* with the use of local anesthesia and hyaluronidase. Thus muscle fibers are more easily separated, and the annoying bleeding and subsequent pain from incision of the muscle substance are minimized.

6. *Bleeding during operation is almost completely eliminated.* There is little or no annoyance from capillary bleeding, and the occasional arterial bleeder, usually encountered on the incised mucosal surface, is easily visualized; hemostasis may be obtained without undue trauma. Any capillary bleeding that may occur after dissipation of the effects of the vasopressor may be controlled by insertion into the anal canal of a small cylinder molded from a piece of Gelfoam® (size 100), from which all the air cells have been expressed; the outer end should be serrated with scissors. The cylinder is permitted to remain in place until it disintegrates, which usually occurs after the first sitz bath on the day after the operation.

Postoperative bleeding is no greater than with other types of anesthesia. In this series the incidence was about 3 per cent. If bleeding occurs, it is usually in the unsutured portion of the wound. Pressure or an immediate simple suture, without need of returning the patient to the operating room, is generally sufficient.

Since delayed or secondary hemorrhage has no connection with the anesthetic but is rather related to the surgical technic used, such hemorrhage is not included in this discussion.

7. *Retention of urine is markedly re-*

duced. Kratzer and Salvati⁴ compared the results obtained in 300 consecutive anorectal operations in which spinal anesthesia was employed with a subsequent consecutive series of 300 operations in which local anesthesia with hyaluronidase was chosen. They observed a statistically significant reduction in the incidence of retention of urine in the patients for whom the local anesthetic-hyaluronidase solution was used.

In the group of patients operated upon with spinal anesthesia, retention of urine occurred in 50 per cent in the early part of the study and in about 36 per cent of the later cases. The variation in incidence was based on the fact that in the first 183 cases catheterization was permitted as seemed desirable, whereas, for the later group, catheterization was not ordered unless the patient failed to void for eighteen hours after the operation.

On analysis of the 300 cases in their series in which local anesthesia had been used, with catheterization performed if necessary only after a lapse of eighteen hours, it was noted that retention of urine had occurred in only 13 per cent of the patients.

In my own series the incidence of retention has been extremely low — not more than 5 per cent. In my patients also, catheterization was not ordered unless the patient had not voided for eighteen hours postoperatively.

Tight, bulky perianal dressings and anal packing or tubing are not used, except for the Gelfoam previously described, for my patients. This, in my opinion, also has had a part in lowering the incidence of retention of urine.

8. *Freedom from untoward effects is* another important advantage of this type of anesthesia. There is no danger of hypotension, which is a risk of spinal anesthesia, or of urinary occlusion, or of back pain.

absence of reaction or by delayed reaction in the lymphatic gland regional to the site of infection, (b) by the absence of visceral tuberculosis at a certain period after infection, or by the presence of lesions less advanced than in the controls, (c) by the absence of any reaction at the site of infection, most frequently observed when the vaccine was suspended in peptone broth and the dosage of infection did not exceed a certain limit

As regards the relationship between hypersensitiveness and immunity the immediate reaction had no significance as an indication or cause of the protection against generalised tuberculosis. The same applies to tuberculin hypersensitiveness. Animals consistently tuberculin-negative during the process of vaccination and infection ultimately proved protected and *vice versa*.

Complete protection was only observed if the dosage of infecting bacilli did not exceed a certain limit. Even if this limit were exceeded an immediate hypersensitive reaction occurred at the site of infection, yet in the great majority of cases no ultimate protection was obtained. In the same way the lesser degree of involvement of the lymphatic gland has no decisive influence on the extent of the visceral tuberculosis.

The production of hypersensitiveness by vaccination may be altered by varying the excipient of the vaccine. Its suspension in peptone broth may lead to a diminution in the immediate reaction at the site of infection, that is to say a diminution in specific hypersensitiveness. These alterations may be explained as a combined effect of the vaccine and the peptone broth. For treatment with the latter alone has certainly an influence on a subsequent tuberculous infection. By treatment with peptone broth alone, although no immediate reaction was obtained after infection, in the majority of the animals the primary lesion was smaller and slower in development and it disappeared in a shorter time than that of the controls. Thus, as a result of peptone glycerol broth treatment we observe at the site of infection signs which may be attributed to immunity without hypersensitiveness, although this certainly is due to a non-specific sensitisation. Differences in the form and development of the primary lesion from that of the controls were also observed, but in a smaller number of treated animals, when the infection was a heavy one. There was a diminution in the glandular reaction at the site of infection in a fair number of animals treated with peptone broth only, 50 per cent displaying less visceral lesions than the controls, while about 25 per cent were completely or almost completely protected against the tuberculous infection. On the other hand there occurred among the treated guinea-pigs a few cases with aggravated tuberculosis, attributable to the treatment, and leading

cuatro años con infiltración local inducida con una mezcla de procaína, hialmo midasa y un vasopresor (3,4-dihidroxinorefedrina). Cada componente es de particular importancia para la anestesia local en cirugía proctológica.

Las características ventajosas del método incluyen: 1) técnica simple y fácil; 2) analgesia inmediata y relajación de esfínteres y tejidos perianales; 3) poca o ninguna distorsión de tejidos; 4) reducción notoria de edema perianal; 5) mas fácil identificación de planos de clivaje; 6) casi ausencia absoluta de hemorragia capilar durante la operación; 7) reducción de orina retenida; 8) ausencia de efectos indeseables; y 9) menor hospitalización después de operaciones anorrectales.

En la opinión del autor este tipo de anestesia es superior a cualquier otro para la mayoría de los procedimientos quirúrgicos en la parte inferior del recto y del ano y es preferida por los pacientes, muchos de los cuales temen los métodos que exigen anestesia espinal.

RÉSUMÉ

Un grand nombre d'opérations anorectales ont été pratiquées durant une période de quatre ans, en utilisant des infiltrations locales d'un mélange de procaïne, de hyaluronidase et d'un vaso-constricteur (3,4-dihydroxynoréphédrine). Dans cette composition chaque produit présente un avantage bien défini pour l'anesthésie locale dans ce genre d'opération.

La méthode présente les avantages suivants: 1) technique simple et facile; 2) analgésie immédiate, relâchement du sphincter et des tissus péri-anaux; 3) absence de distorsion tissulaire, ou distortion minime; 4) nette diminution de l'œdème péri-anal; 5) meilleure séparation des plans de clivage; 6) suppression presque complète, durant l'opération, de l'hémorragie capillaire; 7) diminution de la rétention

urinaire; 8) absence de complications fâcheuses; 9) raccourcissement du temps d'hospitalisation.

Selon l'auteur, ce mode d'anesthésie est supérieur à tout autre pour la majorité des interventions portant sur la partie inférieure du rectum et sur l'anus; il est apprécié des malades, dont beaucoup appréhendent une anesthésie rachidienne.

RIASSUNTO

Negli ultimi 4 anni sono state eseguite numerose operazioni ano-retali in anestesia locale ottenuta con una miscela di novocaina, ialuronidasi e un vasocostrittore (la 3,4-diidrossinorefedrina). In questa miscela ogni componente si dimostra particolarmente favorevole all'anestesia per la chirurgia proctologica.

Fra i vantaggi si devono annoverare (1) la facilità e la semplicità della tecnica; (2) l'analgesia immediata e il rilasciamento dello sfintere e dei tessuti perianali; (3) lo scompaginamento modesto o minimo; (4) la riduzione dell'edema perianale; (5) una soddisfacente delimitazione dei piani di clivaggio; (6) una pressoché completa cessazione del sanguinamento capillare; (7) una riduzione della ritenzione urinaria; (8) la mancanza di effetti collaterali spiacevoli e infine una diminuzione del periodo di ospedalizzazione post-operatoria.

Questo tipo di anestesia è superiore ad ogni altro, secondo l'autore, per la maggior parte degli interventi sul retto distale e sull'ano, ed è anche preferito dai pazienti molti dei quali temono l'anestesia spinale.

ZUSAMMENFASSUNG

In einem Zeitraum von vier Jahren ist eine grosse Anzahl von anorektalen Operationen mit örtlicher Infiltration einer Mischung von Novocain, Hyaluronidase

the response to the application of peptone broth in a tuberculous guinea-pig was different from that in a normal animal. Intracutaneous injection of 0.2 c.c. of 1 per cent peptone broth produced a visible reaction only in those tuberculous animals which had been treated with peptone broth. Histological examination revealed in some of these animals granulomata with a small number of giant cells of the Langhans type at the site of injection after 7 and 9 days (figs. 6 and 7), whereas, at this time, there were no characteristic reactions in the normal and in the non-treated tuberculous animals. After 12 days, however, the tuberculous animals showed a much more accentuated granulomatous reaction than the controls, with giant cell production. After intracutaneous injection of 0.2 c.c. of a $\times 5$ concentrate of the 1 per cent peptone broth, there were differences in the response of the tuberculous and the normal animals. In both, necrosis with scab formation developed at the site of injection after 24-48 hours, but on the whole the reaction of the normal animals was much less, the scabs being much smaller and disappearing after a shorter period than in the tuberculous animals. Histological examination showed at the site of injection after 7 days in the normal animals a superficial scab or scar and slight fibrocytic proliferation with beginning formation of foreign body giant cells in the cutaneous tissue, in the tuberculous animal an extensive necrosis of the whole site of injection with considerable œdema and accumulation of leucocytes and in the peripheral parts proliferation of fibrocytes with formation of foreign-body giant cells. The difference of the response was even more marked 12 days after injection. By this time the cutis of the normal animal had returned to normal or was irregularly interspersed with a small number of foreign-body giant cells, whereas that of the tuberculous animal showed a central fibrotic scar (corresponding to the extensive central necrosis which the tuberculous animal displayed at the 7 days stage) and in the periphery foreign-body granulomata with a large number of giant cells.

All the tuberculous animals, untreated and treated with peptone broth, seal oil or heat-killed tubercle bacilli, showed a response to intracutaneous injection of peptone broth which was different from that of normal animals. A series of 10 tuberculous animals, however, which before tuberculous infection had been injected intraperitoneally with 1 c.c. of 20 per cent calcium-glucono-galacto-gluconate ("Calcium Sandoz") at seven-day intervals 10 to 12 times, reacted to intracutaneous injection of peptone broth very weakly and in the same manner as normal animals. The site of injection, when histologically examined, showed the same attenuated reaction without formation of a scar or granulomata after 12 days. This has to be attributed to the well known influence of calcium treatment diminishing or even preventing

Thoracic Surgery

Substitution for the Esophagus

Report of Eight Cases

WILLIAM L. WATSON, M.D., F.A.C.S.

NEW YORK CITY, NEW YORK

FOR more than half a century surgeons have been seeking and never quite discovering the ideal operation for esophageal carcinoma. Fairly satisfactory surgical procedures have been worked out for the management of carcinoma occurring in the cervical portion of the esophagus and for growths arising in the lower one-third or cardiac portion. When the malignant growth is located somewhere between the thoracic inlet and the level of the left main stem bronchus, surgeons face formidable technical difficulties, which in many instances will effectively prevent them from doing a satisfactory operation. In this anatomic area surgical reconstruction is also more hazardous and more technically difficult than it is at either the upper or the lower portion of the gullet.

Discussion in this report is limited to carcinomas arising in the upper half of the thoracic portion of the esophagus, and it is recognized at the outset that the prognosis for such lesions is very poor. Most of the unlucky patients have a short life expectancy at best, so it becomes the surgeon's duty to restore to them as soon as possible the ability to manage their own saliva and take liquid and solid food by mouth. Gastrostomy alone is a poor method of palliation for many reasons, even though it does prolong life for slight-

ly more than an average of four months.

Most methods of reconstruction after esophagectomy leave something to be desired, and some leave the patient in a miserable condition right up to the time of his death. In my own effort to find the best method of replacement after total esophagectomy, a number of procedures have been tried. Forty-eight patients have undergone total esophagectomy of the Torek type, and for 31 of these it has been possible to reestablish the swallowing function.

Six different methods of esophagoplasty have been given a trial. My first attempts were made by the use of rubber or plastic appliances, but after trial of this method in several cases it was given up as hopeless. Next I tried eutaneous anterothoracic esophagoplasty in 6 cases and ran into the usual complications—gastric regurgitation, ulceration, stenosis and prolonged morbidity. My third attempt was directed toward the use of the jejunum, in 2 cases an anterothoracic jejuno-esophagostomy was performed, and in 4 cases a retrosternal jejuno-esophagostomy was done. One of the patients who underwent reconstruction by the anterothoracic procedure has gone along well over the five-year period. I also had some success when I turned to gastroesophageal anastomosis in the neck, and this type of operation was carried out in 10 instances. In my latest attempts to solve the

Read at the Twenty-first Annual Congress of the United States and Canadian Surgeons, International College of Surgeons, Chicago, Sept. 1-11, 1944.
Submitted for publication, Sept. 21, 1944.

The night before operation a colon irrigation is given until clear fluid is returned.

The abdomen is entered by an incision approximately from the xiphoid to the umbilicus, and the abdomen is explored for metastatic carcinoma. The cecum and the right half of the colon are then mobilized, and the ileocolic and right colic arteries are occluded with bulldog clamps, care being taken to place the clamp proximal to anastomosing vessels. The ileum and the transverse portion of the colon are cleared at the point where division is to take place, and a rubber-shod clamp is placed across each to prevent bleeding through the bowel wall or the immediately adjacent vessels. If there is good circulation after fifteen minutes the right colic and ileocolic arteries are divided near

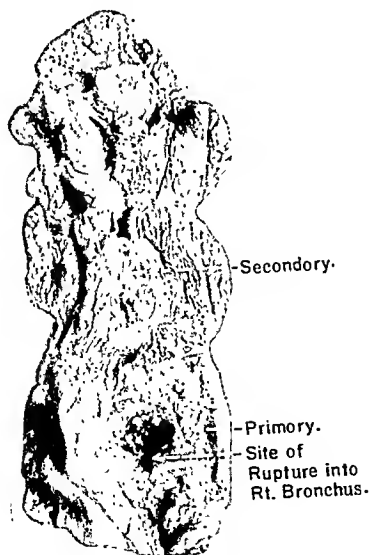


Fig. 1

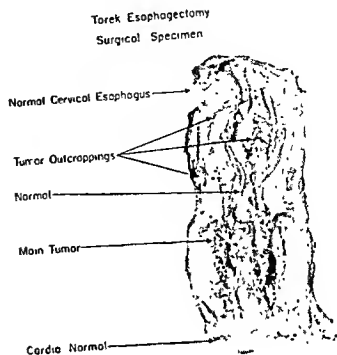


Fig. 2

their point of origin and the ileum is transected. During the waiting period an appendectomy is performed.

The substernal tunnel is now prepared and the retrosternal space entered from above by a collar incision in the neck and from below by an incision of the sternal origin of the diaphragm at the xiphoid. The tunnel is then made by blunt dissection, largely with the finger and hand or with gauze dissectors. When the tunnel is adequate a catheter is passed downward through it, the ileal sutures fixed to it and the terminal portion of the ileum and colon drawn up into the neck. Care is taken to prevent twisting the blood vessels and tearing the mesenteric vessels by too much stretching. In my opinion it is important not to tear the pleura and have the colon lie in the free pleural space, since redundant loops could easily become caught, distended, obstructed or even gangrenous.

The esophageal stump is mobilized and the ends freshened. If sufficient length is available, the ileum is removed and an esophagocecostomy is performed. If length is lacking and

viable,

1 2 3

4

5

ont été opérés en deux temps, le 8e en un temps combiné.

Sept malades sont actuellement encore en vie. Quatre d'entre eux ne présentent aucune évidence de récurrence, ils peuvent s'alimenter de façon relativement normale après fermeture de la gastrectomie. Dans deux cas on note encore des complications nécessitant une gastrostomie active (pas de récurrence carcinomateuse). Un malade est atteint de cancer généralisé, cependant il s'alimente bien et la déglutition est normale sans gastrostomie. Un malade est décédé après l'opération des suites d'une hémorragie non diagnostiquée due à une perforation de la carotide.

RESUMEN

Se reportan ocho casos de esofagectomía total con restablecimiento de la continuidad del tracto gastrointestinal usando hemicolectomía. En 7 casos la operación se efectuó en dos tiempos; en uno, en un solo tiempo combinado.

Siete pacientes viven hasta la fecha. Cuatro están sin recidivas evidentes y son capaces de comer casi normalmente después del cierre de la gastrostomía. Otros dos aún tienen complicaciones y necesitan de la gastrostomía, pero no muestran carcinoma recidivante. Uno tiene invasión generalizada pero come y traga bien y no necesita la gastrostomía. Un paciente murió después de la operación por hemorragia no observada de una arteria carótida perforada.

SUMARIO

Apresenta oito casos de esofagectomia total com reconstrução pelo uso de metade esquerda do colo. Em 7 operações praticou o tratamento em 2 estagios. Sete pacientes sobrevivem. Quatro não apresentam recidiva e são capazes de comer relativamente bem após o fechamento da gastrostomia.

Os outros dois ainda têm complicações, necessitando de permanecer com as gastrostomias porém sem sinais de recidiva. Um paciente tem disseminação maligna do tumor embora se alimente e enula sem necessidade de gastrostomia. Um doente morreu após a operação por uma hemorragia não reconhecida e devida a uma lesão da carótida.

ZUSAMMENFASSUNG

Es wird über acht Fälle von totaler Speiseröhrenresektion mit Wiederherstellung der Kontinuität des Magendarmkanals unter Verwendung der rechten Dickdarmhälfte berichtet. In sieben Fällen wurde die Operation in zwei Sitzungen ausgeführt, in einem Falle erfolgte ein kombinierter Eingriff in einer Sitzung.

Zur Zeit der Niederschrift dieses Berichtes befinden sich noch sieben der Patienten am Leben. Vier davon weisen keine Zeichen eines Rückfalls auf und sind in der Lage, nach Schluss der Magenstoma, verhältnismässig normal zu essen. Zwei andere Kranke leiden noch unter Komplikationen und sind noch auf die Funktion der Magenstoma angewiesen, zeigen aber kein rezidivierendes Karzinom. Ein Kranker zeigt eine allgemeine Aussaat der bösartigen Geschwulst, isst und schluckt jedoch gut und braucht keine Magenstoma. Ein Kranker starb nach der Operation an einer unerkannten Blutung aus einer perforierten Halsschlagader.

REFERENCES

1. Kelling, G.: Oesophagoplastik mit Hilfe des Querkolens, Zentrbl. f. Chir. 38:1209-1212, 1911.
2. Ochsner, A., and Owens, N.: Anterotheracic Esophagoplasty for Impermeable Strictures of the Esophagus, Ann. Surg. 100:1055-1091, 1934.
3. Sherman, C. D. Jr.; Mahoney, J. A., and Stabins, S. J.: Intrathoracic Esophagoplasty for Esophageal Cancer, Cancer 8:1198-1205, 1953.

In England in the fourteenth century the term "leech" was generally applied to the members of the medical profession. They had to belong to the guild or fraternity of Barbers, and might be known as a Barber practicing surgery. There were a few learned masters of surgery. After the union of guilds in 1450, the appellation "Barber Surgeon" came into use. In German countries the barber was generally connected with baths and came to be known as Bader or Balneator. These attendants let blood, sold ointments, pulled teeth, practiced cupping and gave enemas. The monks in the monasteries who required their services for the tonsure, employed them also for blood-letting. Blood-letting was practiced periodically.

John Flint South,³ who was twice president of the Royal College of Surgeons, compiled the earliest records of the barbers and surgeons of the city of London under the title "Memorials of the Craft of Surgery in England." This is no doubt the most authentic work on the beginnings of the barbers who were surgeons and the surgeons who were masters of surgery, their ultimate union as barber-surgeons and their final emergence as the Royal College of Surgeons.

Among the great surgeons of Europe in the fourteenth century were Lanfranc who died in 1306, de Mondeville who lived from 1260 to 1320, Guy de Chauliac, who died in 1368, and Jan Yperman, a Flemish surgeon who died in 1350.

In England John Arderne was born in 1307. D'Arcy Power,⁴ in a Harveian Lecture delivered March 12, 1914, provides an interesting picture of this original surgeon who was skillful in leechcraft, a believer in spells, and the author of a manuscript on a roll of vellum, written before printing was known. The original manuscript is now in the Royal Library in Stockholm. Lanfranc, de Mondeville and de Chauliac were well educated sur-

geons; Arderne learned his surgery in the army. As an example of his belief in magic and spells is his treatment of epilepsy. He recommended that the words Jasper, Melchior and Balthazar be written with blood drawn from the auricular or little finger of the patient. The paper bearing the words was worn by the patient, who said daily for a month three Pater Nosters and three Ave Marias for the souls of the fathers and mothers of the three kings. For constipation Arderne wrote: "Let the man drink 'de brodi'." This was the equivalent of beef tea. However, this was not the common treatment. "If he be rich" he was to have beef tea according to Arderne, "but if he is a pauper he may just drink his own urine."

Here is an example of the surgery of John Arderne:

"I saw a young man with a stone as big as a bean so lodged in his penis that it could not escape through its eye, neither could it be pushed back, but it remained in the middle of the organ as it is here shown. I cured him easily with an incision, for I put him on his back and tied his member with linen threads on each side of the stone to prevent its shifting, and after making a small cut with a lancet over the stone I squeezed it out. I then sutured the skin with a needle and thread over the hole, and dressed it with white of egg and finely ground flour, and having wrapped up the penis in a piece of old and thin linen I let him go in peace for three days. I cut and removed the thread at the next dressing, and in less than a fortnight I had cured him completely. There is no need for alarm in these cases, even though the urine escapes from the wound for three or four days after such an operation, for the patient will certainly be cured."

As might be expected the ignorance of anatomy and physiology displayed by the barbers and itinerant surgeons brought them frequently into conflict with the physicians and with the victims of their barbarities. In 1337, Garrison says, a strolling eye surgeon was thrown into the

and then elect their officers for the ensuing year. In the Barbers Guild women might become members but could not hold high office. By 1375 some of the barbers had come to be barber surgeons and the guild was divided into two classes—the barbers who practiced shaving and the barbers who practiced surgery. About 1375 the Guild of Barbers secured an ordinance that “no unlicensed person of the barbers would be appointed.” The record of this ordinance follows:

On the sixth day of October, in the 49th year of the reign of King Edward the Third, after the Conquest (A.D. 1375) John Warde being Mayor. To the honor-

able and wise Lords the Mayor and Aldermen of the City of London; the good folk Barbers of the said city show that from day to day there come from Uppelande, Men, Barbers, little skilled in their craft, into the said city, and take houses and intermeddle with barbery, surgery, and with the cure of other sicknesses, whereas they know not how to do such things nor ever were qualified in that craft to the great damage and cheating of the people and to the great scandal of all the honest barbers of the said city: wherefore the said good folk pray that it would please your honorable lordships for God's sake and in the work of charity to ordain and establish that henceforth no such stranger coming into the said city from Uppelande or from any other part, whatever be his condition should occupy house or shop of Barbery in the city itself before he has been found able and skilled in the said art and craft of barbery and that by trial and examination of the good folk barbers of the city itself. And that you would please to ordain and establish that from henceforth there should be for all time two honest persons of the said trade chosen by common assent to be guardians of the said craft. That these two should be presented to the Mayor, Recorder and Aldermen of the said city and sworn before them well and loyally to rule their mystery to the best of their power and skill. And that the masters should oversee the tools of all the said art that they be good and fitting for the use of the people to avoid the peril which might happen. And that on the complaint of the two masters all rebels from the said craft shall be made to come before you and whoever shall be found in defiance of this ordinance shall pay to the chamber x*l*. And that henceforth no men of this craft shall be received into the franchise of the city if he have no witness for honesty and ability by good examination before you, and that no stranger shall hold house or shop of this craft within the said city nor within the suburbs thereof. And that this ordinance be enrolled in the chamber of the Gyhall (Guildhall) of London to endure for ever.

Which was granted to them.

And therefore

THE SURGIIONS DIRECTORIE,

FOR
Young Practitioners,
In Anatomie Wounds, and Cures, &c.
SHEWING,

The Excellencie of divers Secrets
belonging to that noble Art and
Mystery.

Very usefull in these Times upon any
Sudden Accidents.

And may well serve
As a noble Exercise for Gentle-
women, and others; who desire Science in
Medicine and Surgery, for a
generall Good.

Divided into X. Parts.

(Whole Contents follow in the next Page.)

Written by T. Vicary Esquire, Chyrurgion
to Her R. Ed. 6. R. Mary. 2. Eli.

LONDON,

Printed by T. Fawcett dwelling in Shoe-
Lane, at the Signe of the Dolphin. 1651.
And are to be sold by T. Nethall at his Shop in
Sturbridge at the Signe of Horse and Pillars.

Their symptomatology is usually that of the disease to which they are secondary and their origin is plain. There remains, however, a large group in which the cavitation of the cord seems to have resulted from degeneration within an area of gliosis. Most examples of syringomyelia, by a consensus of opinion, are thought to belong to this group. Here areas of gliosis may be observed without cavitation, while elsewhere cavities, often of considerable size, are present. The walls of such cavities are of glial origin and usually stain weakly with glial stains.

A smaller group exists in which the cavities are not so frankly degenerative in origin. Small cavities and slits have been reported and to these it has been objected that the name syringomyelia is inapplicable. From their nature and position it seems clear that many of these have resulted from maldevelopment of the central canal or of the neighbouring tissue. Hydromyelia or over-distension of the central canal belongs to this group. Although clinically not usually presenting the classical signs of syringomyelia, it may co-exist with this condition, or the syringomyelic cavity may seem to be the result of a diverticulum which has been forced out from the over-distended central canal. On other occasions the distended central canal has been interpreted as having resulted from the bursting into it of a syringomyelic cavity.

Possibly there is also a common developmental origin for the majority of cases of clinical syringomyelia. It is obvious that where developmental errors already exist in an individual, other deformities must fall under the suspicion of a similar origin. As was well known to earlier authors (Schlesinger, 1902), such congenital abnormalities as spina bifida, anencephaly etc., may coexist with syringomyelia. This has been the subject of further comment in recent years. Thus the "status dysraphicus," a condition characterised by such deformities as bending of the vertebræ, funnel breast, club foot etc., is presumed to be the result of faulty closure of the medullary canal. Curtius and Lorenz (1933-34) subjected 32 individuals suffering from this condition to a careful scrutiny and found 21 to present neurological symptoms. They noted a close relationship between syringomyelia and status dysraphicus, spina bifida occulta was found in 17.3 per cent of their cases and in 8 out of 11 patients suffering from syringomyelia, moreover status dysraphicus was often present in the families of these individuals.

The syringomyelic complications of spina bifida have recently been made the subject of a communication by Turnbull (1933). Although reports of familial syringomyelia are few, the subject has been reviewed of late by Mankowsky and Czerni (1932-33) and by van Bogaert (1933-34) who have added new cases. It is possible that these cases may be more common than has been

well shaped nails, cleaned of all blackness and filth. He should hear many things and speak but few, for a wise man sayeth, it seemeth more to use the eres than the tunge." He also said that "if you had been still you would have been held a philosopher . . . When he shall speak, be the word short and as much as possible fair and reasonable and without swearing."

When Henry V went to war across the channel he arranged for a physician and surgeon to accompany him. His surgeon was Thomas Morstede. The surgeon was directed to take with him twelve of his own craft. He was given the privilege of choosing those who should accompany him. Subsequently the Barbers and Surgeons Company and the Corporation of Surgeons after them were called on to choose surgeons to serve in the army and navy.

Sometime between May, 1421, and May, 1423, the College of Physicians under the control of a rector of medicine joined with the surgeons in petitioning the Aldermen for authority to improve the professional acquirements and social position of themselves and their successor. The surgeons who joined in this move were a society distinct from either the barbers or the barber surgeons and probably originated from the military surgeons. This group got authority to conduct examinations for both medicine and surgery, to assign physicians or surgeons to the poor, to visit apothecary shops and throw away bad medicines, and to make sure that anyone who claimed to have graduated in medicine could submit proof of it. By 1435 this conjoint college of physicians and surgeons seems to have disappeared and in that year regulations were established for the government of the Guild of Surgeons. Dates were established for their assembling and the choosing of the masters. The regulations included the

control of foreign physicians, the taking of cases, of apprentices, and many other types of regulation. An oath was created which was to be taken by each member.

The masters in surgery up to this time had not made any fusion with the barber surgeons. In the year 1452 the Guild of Barbers in the city of London obtained a

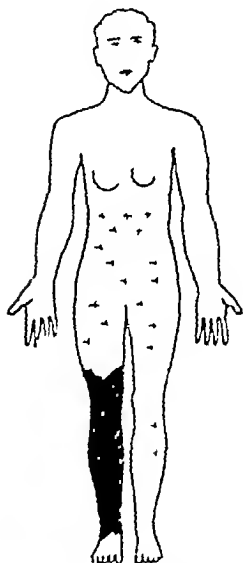


Manuscript of *De Arte P*
of Master John A

ia

appreciated below level of about seventh thoracic segments and when felt said to feel distant, usually not felt over anterior surface of right thigh and rarely over anterior surface of this leg, not felt or said to be dulled over posterior surfaces of both legs, especially right. Pin prick dulled over same zone and rarely felt over anterior surface of right leg. Heat and cold affected over same areas (fig 1). Pressure on right tendo Achillis did not produce pain. It could be produced on the left side, but at a pressure greater than normal. Vibration sense absent over both internal malleoli.

The loss of all forms of sensation over an area corresponding to the right fourth and fifth lumbar segments and the absence of the right knee jerk rendered it likely that a lesion of a series of posterior roots or root zones was present. The hypoaesthesia below the level of the seventh thoracic segment indicated that a second more highly placed lesion was present. The patient was accordingly admitted to hospital as suffering from multiple tumours of the spinal cord.



■ LOSS OF ALL FORMS OF SENSATION

⊕ ZONE OF HYPOAESTHESIA AND HYPOAESTHESIA

FIG. 1.—Zones of sensory disturbance

10/1/35 Left knee jerk still extremely active, but no other tendon reflex elicited from either lower limb. Both plantar reflexes now extensor by Oppenheim method. All movements of left lower limb now impaired, also flexion and extension at left wrist and finer movements of left hand. In addition to what was recorded above, cotton wool was not appreciated over lower part of chest and was impaired over mesial borders of forearms, and not appreciated over left fourth and fifth lumbar segments. Pin prick impaired or lost over same areas.

Spinal fluid pale yellow but clear. It contained 1.5 per cent of protein, globulin was positive and chlorides were 0.75 per cent. Average of one lymphocyte per c.c. Wassermann test at first negative, but later showed a slight reaction. Blood also showed a slight Wassermann reaction.

A skiagraph of the spine revealed no abnormality. No spina bifida was present. Descending lipiodol was held up at the level of the disc between the eleventh and twelfth thoracic vertebra although the greater quantity of this material descended.

Antispasmodic treatment was commenced. She showed no improvement. Progressive weakness of the legs, and of the arms to a lesser extent, was observed. On 12/3/35 a marked lateral nystagmus was noticed. She became progressively weaker and, although no further gross sensory changes were noted, she complained of constant pains about the neck and back. On 20/3/35 a bronchopneumonia developed and she exhibited grave weakness of the respiratory muscles. Two days later she died.

Autopsy

Except for bronchopneumonia, the thoracic and abdominal organs presented no noteworthy abnormalities.

Examination of the brain and cord. The brain, examined after fixation, presented no abnormality. The cord, which had been

his titles in 1443 for "not only had he espoused a wife but a widow." In 1452 celibacy was abolished by the Cardinal as "unreasonable and impious in a doctor." Medical students, however, if they were married, were not admitted to licensure before 1600.

In the early days of the University of Paris medicine did not include surgery because surgery was forbidden to clerics. While this concept prevailed in Paris, Oxford and Cambridge, it did not apply in Bologna, Padua, and elsewhere in Italy, nor in Montpellier where Guy de Cahuliac taught the surgical art. In Paris the teaching of anatomy was delegated by the professor to a surgeon barber, for anatomy was only a "manual exercise and commanded no respect."

When Italian surgeons came to Paris quarrels began and these caused Jean Pitard to organize the teaching of surgery and to organize the previously mentioned Confrerie du Saint Come. The physicians had St. Luke and perhaps a hundred minor saints as patrons, the surgeons had only Saint Cosmas and St. Damian. When it became necessary to bleed the King, the first physician held the torch, the first surgeon performed the operation and the first apothecary held the basin. The surgeons were involved in constant quarrels with the barbitonsors. The medical faculty spited the surgeons by favoring the barbers whenever possible. Finally in 1423 the surgeons secured a decree from the Provost of Paris prohibiting the barbers from exercising any of the functions of the surgeon.

Early German surgery began with a Bavarian army surgeon, von Pfolspeundt, whose work written in 1460 remained for many years, like that of John Arderne, simply in manuscript form. As a consequence of the great setback of the 30 years war, general surgery was practiced mainly by the executioner and the barber and the

itinerant bonesetter. Among the duties of the army surgeon was shaving of the officers. Hence army surgeons were called "feldscherer" which was contracted to "feldscher," a lower class of army surgeons revived in some countries in World War II.

For some hundreds of years the barbers and barber surgeons dominated the British surgical scene. A Guild of Barber Surgeons was formed in the city of York.⁷ The entry of the first barber was in 1299. In the next 50 years, 17 barbers were admitted. A note dated 1346 records payments to two barber surgeons for extracting arrows and healing a citizen. Ordinances were developed for the barber surgeons, one of them requiring that they do not follow their craft on the Lord's day on pain of excommunication.

In 1555 the London Corporation of Barber Surgeons resolved to nominate two of their members to give instruction in anatomy. In 1614 the Company of Surgeons of York resolved to choose one to be a master in anatomy.

Every surgeon in York was compelled to join the company or to be expelled from the city. The penalty of 40 shillings was set up compelling every man or woman in the city to consult a licensed surgeon before consulting any unlicensed practitioner.

In Newcastle-on-Tyne⁸ an ordinance relating to the barber was dated 1442. In 1648 they petitioned for a site to erect a meeting house and to plant a garden in which to grow medicinal herbs. By 1652 meetings were regularly held in the Barber Surgeons Hall.

A visitor named Celia Fiennes in a book called "Through England on a Side-Saddle" describes it as it was in the time of William and Mary, 1689-94. There with a round table in it raised seats or benches for the convicts to read the reading lecture. The

2nd cervical segment (fig 3) The central and dorsal portions of the cord were replaced by a moderately well defined cellular mass which reached the surface in the region of the postero-median fissure. The grey matter and the tissue of the columns were compressed into two narrow ribbons, all semblance of normal structure being lost. Under high magnification, the central mass was found to be composed of a tissue resembling a moderately cellular astrocytoma (figs 4 and 5). The nuclei of the individual cells were large and vesicular, each showing a well marked chromatin net, and they were considerably larger than those of the astrocytes in the neighbouring white and grey matter. The nuclei were lobed, oval or rounded, and often multiple, the cell usually then being of giant size. No mitotic figures were observed. The cytoplasm was not prominent. Between the cells, numerous

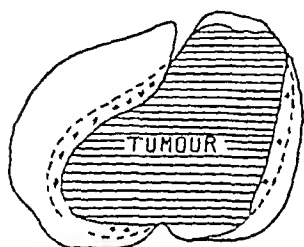


FIG 3—Cross section of cord at level of 2nd cervical segment. Transverse lines = tumour, crosses = nerve cells.

fine and coarse neuroglial fibres, often widely separated, could be demonstrated by suitable stains. In some areas the tissue was vacuolated, as if oedematous, in other areas fine fibrils could be seen in strands of considerable width. The tumour tissue was moderately vascular. The vessel walls were prominent and often showed the marked endothelial hyperplasia encountered in the more active tumours of the central nervous system. The neighbouring grey and white matter, although showing many

intact myelin sheaths, presented considerable evidence of destruction. The nerve cells, however, were on the whole remarkably well preserved. Thus by the toluidine blue method, many cells showed an unaltered content of Nissl bodies. The pia was thickened and in places the margin of the cord was invaded by tufts of new vessels surrounded by much fibrous tissue. The nerve roots contained many degenerated myelin sheaths. No evidence of an acute inflammatory lesion was present in this segment. The central mass resembled tumour formation rather than a gliosis, being cellular, well defined and vascular.

5th cervical segment (fig 6) Here the normal appearances were confused by the presence of numerous downward prolongations of the tumour. Thus the region of the postero-median fissure was occupied by a tongue of tumour that almost split the cord into two portions and the marginal areas were also indented and occupied by portions of growth all fairly clearly demarcated from the non-neoplastic areas. The structure of the tumour was similar to that described above. The numerous blood vessels were rendered hyperplastic by proliferation of endothelium and connective tissue,

of the books during 1638 and 1639 showed that the books were well bound and fastened by clasps to an iron chain so that they could not be removed. Eventually the properties of the predecessors passed to the Royal College of Surgeons although most of the books seem to have been lost. When the Royal College of Surgeons was established it had at first a governing body which included the Master, the Wardens and the Court of Assistants. These titles had been evolved from the earlier groups. In 1308 there were only Masters. In 1416 the Guild of Barbers had Masters and Wardens. The titles had been inherited from the Surgeons' Company which in turn took them from the United Company of Barbers and Surgeons and they took them from the Barbers' Company established in 1462. The paraphernalia of office coming down from the past included the Mace and the three-cornered hat. The mace is still symbolic and one was sent by the Royal College of Surgeons to the American College of Surgeons and was carried in the procession of that august body when it was organized in 1913.

In 1529 Ambroise Paré came from the provinces to Paris. He was at that time a rural barber's apprentice. His father was a valet and barber, his brother-in-law, Gaspard Martin, a master barber-surgeon in Paris. Soon after coming to Paris he obtained the position of resident in the largest hospital in Paris, the Hotel Dieu. He was then 19 years old. Sometime later he wrote:

"I was resident the space of three years in the hospital of Paris, where I had the means to see and learn diverse works of chirurgery, upon divers diseases, together with the anatomy, upon a great number of dead bodies, as oftentimes I have sufficiently made trial publicly in the physicians' school at Paris, and my good luck hath made me see much more."

The French surgeon owed improvements in his social condition to the fistula of

Louis XIV and its successful treatment by Felix. Felix and his successor Mareschal were made royal surgeons. In 1724 Mareschal obtained from Louis XV the creation of five chairs of surgical instruction at St. Come. The Paris medical faculty revolted, marched in procession to St. Come and harangued against the surgeons. The mass of the people sided with the surgeons. Then in 1731 the Academy of Surgery was founded and in 1743 Louis XV promulgated an ordinance which delivered the surgeons from further association with the barbers and wig makers, who were forbidden to practice. The ordinance further declared that no one could be a master in surgery without being a master of the arts. The Academy of Surgery was abolished in 1792 during the French Revolution. In 1794 a new edict broke down any distinction between physicians and surgeons as separate guilds and practice was thrown open to everybody who could pay for a license. In 1803 examinations and diplomas were revived and a controlled scientific profession was on its way to its present dignified state.

In England separation of the surgeons from the barbers occurred in 1745. The surgeons were elected as masters, governors and the Commonality of the Arts and Science of Surgeons of London. The surgeons left to the barbers the hall, the library, and the silver.

Properly at this point comes a reference to the place of anatomy in the apprenticeship served by the young men who became surgeons. In 1540 the guild of surgeons which had always taught its members and apprentices by lectures got an act providing them with bodies for dissection:

That the sayd maysters or gouvernour of the mistery and comminaltie of harbours and surgeons of London, and their successors yerely for euer after their said crecions at their e and plea shal and maie out traction foure i

the dorsal surface, parallel to and behind the transverse slit. This slit was a new structure, it varied somewhat in sections of the same segment, usually showing a curved outline but with many small limbs. Somewhat below this area, an accessory slit was well developed, its wall being of uniform structure (fig. 9). In the main it consisted of polar cells or their processes set at right angles to the surface. At the ends of the cavity these cells radiated like the spokes of a wheel. They were undoubtedly glial, and well developed neuroglial fibrils could be seen lying between and parallel with the cells (fig. 10). The fibrils could be traced into the cytoplasm of the cells and into their processes. They were often coarse, but on occasion fine. The cells were similar in appearance to many encountered in the neoplastic mass. The tissue of the wall was of much the same thickness and clearly demarcated from the neighbouring tissue. It did not appear to be of degenerative origin. The individual cells were usually bipolar, although sometimes a process might be seen to bifurcate. Fibrils were not present in every cell nor could more than an occasional fibril be traced to any individual cell. The total bulk of the fibrillar matrix was much greater than that of the cell bodies. The nuclei of the cells, round or oval in shape, were moderately deeply stained, usually showing a fine chromatin net and well developed masses of chromatin. Only small vessels were present in the cavity wall but a considerable number were present outside it. Their walls were often fibrotic and as a result the outer margin was often well demarcated by a line of vascular connective tissue. The cavity of the slit contained in places a coiled mass of fibres staining yellow with van Gieson's stain and dense blue with iron hæmatoxylin. The tumour was now represented by a small marginal area, still retaining its characteristic structure. In addition, a small tongue lay posterior to but barely in apposition with one extremity of the slit. Here the vessels were grossly thickened, the walls showing a marked degree of hyaline change, with in places an absence of lumen. The pia was thickened on the posterior aspects of the cord, where numerous small vessels with fibrotic walls could be observed entering. The cytoplasm of the nerve cells showed very little alteration of the Nissl body content and the myelin sheaths showed no gross alteration, even on the posterior aspects of the slit. No acute inflammatory cells were present.

3rd thoracic segment. Entirely different appearances were present. The cord was markedly deformed and flattened antero-posteriorly, its margin being crenated. This was in part due to the great thickening of the pia and the invasion of the cord by numerous thick-walled vessels and connective tissue trabeculae. So marked was this that the marginal portion of the cord in section was separated into islands by connective tissue bands. Glial

Cumston¹⁰ wrote the history of this picture in 1912. Apparently it was planned and partly painted by Holbein but finished by another artist. The picture is still in the possession of the Company. It was injured in the great fire of London and Pepys thought at one time of buying it.

An excellent picture of the evolution of the teaching of anatomy in Great Britain through the time of William and John Hunter is provided in the first chapter of George C. Peachy's *Memoir of William and John Hunter*.¹¹

In 1790 the Company of Surgeons got its own habitation. Then in 1800 the Corporation of Surgeons was rechartered by George III as the present Royal College of Surgeons of England. In 1784 the College of Surgeons of Ireland was founded. The development of surgery in Germany was slow. Frederick the Great sent medical cadets to Paris to complete their education and in 1743 engaged 12 French surgeons to look after his troops. The *Prussian army surgeon of that day* was ranked above a drummer and beneath the chaplain. In 1785 the *Colegium Medico-Chirurgicum* was converted into a medical surgical society which was devoted exclusively to the education of army surgeons, and this later became the Friedrich Wilhelm Institute.

The Profession of Surgeon

In the United States of 1957 the surgeons are most organized of all the branches of the medical profession. When a few surgeons get together for improving their education, their technical skill, their learning or teaching, their travel or their investments, they form a society. In the Great Britain, France, Germany, or Italy of the years 1800 to 1800, society itself was being organized for the protection of the workers in trades or professions. There were few organizations of the people themselves to protect themselves against social

changes. The physicians, as Sir D'Arcy Power pointed out, were generally ecclesiastics who studied books and taught theory; the apothecaries were offshoots of the grocers who made and sold remedies and were not averse to prescribing; the family doctors were usually just people who had learned about herbs and plant remedies. Ignorant pretenders to knowledge and skill traveled about couching for cataract, treating ruptures, cutting for stone, setting bones, pulling teeth, and shouting their virtues. The barbers were first impressed into caring for the ton-sures in the monasteries; then into the letting of blood, and gradually as they picked up information and skill, into other medical and surgical procedures. As the universities were formed men trained in general knowledge as masters of art began studying anatomy and became masters of surgery. As society became more complex, it became apparent that distinctions would have to be made. To the guilds of the tradesmen were added the guilds of the barbers and the guilds of the surgeons with authority conferred by government, distinctive costumes, rights and privileges and with these responsibilities. Because both knowledge and skill were primitive and the results of surgery often doubtful, the surgeon was careful to get his fee before operating; operations were done in the patient's home and the surgeon lived in the patient's home until the patient was cured. Sometimes he would look at the wound and then in the still hours of the night silently ride away. Out of such situations a series of principles or practices or a sort of code of ethics began to form and was written down by the leaders to guide the group. One such leader wrote:

A wise surgeon will refrain from stealing anything while he is actually attending a patient.

He should be careful not to employ notoriously bad characters as his assistants, for these things may spoil

the dorsal surface, parallel to and behind the transverse slit. Thus the slit was a new structure, it varied somewhat in sections of the same segment, usually showing a curved outline but with many small limbs. Somewhat below this area, an accessory slit was well developed, its wall being of uniform structure (fig 9). In the main it consisted of polar cells or then processes set at right angles to the surface. At the ends of the cavity these cells radiated like the spokes of a wheel. They were undoubtedly glial, and well developed neuroglial fibrils could be seen lying between and parallel with the cells (fig 10). The fibrils could be traced into the cytoplasm of the cells and into their processes. They were often coarse, but on occasion fine. The cells were similar in appearance to many encountered in the neoplastic mass. The tissue of the wall was of much the same thickness and clearly demarcated from the neighbouring tissue. It did not appear to be of degenerative origin. The individual cells were usually bipolar, although sometimes a process might be seen to bifurcate. Fibrils were not present in every cell nor could more than an occasional fibril be traced to any individual cell. The total bulk of the fibrillar matrix was much greater than that of the cell bodies. The nuclei of the cells, round or oval in shape, were moderately deeply stained, usually showing a fine chromatin net and well developed masses of chromatin. Only small vessels were present in the cavity wall but a considerable number were present outside it. Their walls were often fibrotic and as a result the outer margin was often well demarcated by a line of vascular connective tissue. The cavity of the slit contained in places a coiled mass of fibres staining yellow with van Gieson's stain and dense blue with iron hæmatoxylin. The tumour was now represented by a small marginal area, still retaining its characteristic structure. In addition, a small tongue lay posterior to but barely in apposition with one extremity of the slit. Here the vessels were grossly thickened, the walls showing a marked degree of hyaline change, with in places an absence of lumen. The pia was thickened on the posterior aspects of the cord, where numerous small vessels with fibrotic walls could be observed entering. The cytoplasm of the nerve cells showed very little alteration of the Nissl body content and the myelin sheaths showed no gross alteration, even on the posterior aspects of the slit. No acute inflammatory cells were present.

3rd thoracic segment Entirely different appearances were present. The cord was markedly deformed and flattened antero-posteriorly, its margin being crenated. This was in part due to the great thickening of the pia and the invasion of the cord by numerous thick-walled vessels and connective tissue trabeculae. So marked was this that the marginal portion of the cord in section was separated into islands by connective tissue bands. Glial

must be themselves physicians with a training above that of physicians generally. The problems of greed, ignorance, quackery, and inhumanity which troubled the master surgeons and the guilds still remain, and if they are ever to be solved

by social controls, the surgical organizations will have to solve them.

—MORRIS FISHBEIN,
M.D., F.I.C.S. (Hon.)
Chicago, Illinois

REFERENCES

1. Rogers, G.: *Lancet*. New York: G. P. Putnam's Sons, 1956.
2. Fishbein, M.: *The Evolution of Surgical Organizations*, Proc. Internat. Coll. Surgeons, Geneva, May 23-26, 1955. *Medicine et Hygiene*, Geneva, 1955.
3. South, J. F.: *Memorials of the Craft of Surgery in England*. Edited by D'Arcy Power, with an introduction by Sir James Paget. London: Cassell and Company, 1886.
4. Power, D'Arcy: *Selected Writings, 1877-1920*. Oxford: Clarendon Press, 1931, p. 29.
5. Castiglioni, A.: *A History of Medicine*. New York: Alfred A. Knopf, 1947, p. 403.
6. Riesman, D.: *The Story of Medicine in the Middle Ages*. New York: Paul B. Heeber, Inc., 1935, pp. 150-153.
7. Auden, G. A.: *The Guild of the Barber Surgeons of the City of York*, Proc. Royal Soc. Med. 21:1400-06, 1928 (Section on the History of Medicine, meeting held May 18, 1927).
8. Pybus, F. C.: *The Company of Barber Sur-*

geons and Tallow Chandlers of Newcastle-on-Tyne, Section on History of Medicine, Proc. Royal Soc. Med. meeting Dec. 17, 1924, 22d session, pp. 287-296, 1928-1929.

9. Cresswell, C. H.: *Surgeons and Barbers of Edinburgh: Their Specialty in 1722*, Edinburgh Med. J. 11:44-60, 1913.

10. Cumston, C. G.: *The Corporation of Barbers and Surgeons in England and Holbein's painting*, New York M. J. 95:177-178, 1912.

11. Peachey, G. C.: *A Memoir of William and John Hunter*. Plymouth, England: John Brendon and Son, Ltd., 1924.

ADDITIONAL SOURCES

Griffith, E. F.: *Doctors by Themselves: An anthology*. Foreword by Rt. Hon. The Lord Horder. London: Cassell & Co. Ltd., 1951.

Major, R. H.: *A History of Medicine*. Springfield Ill., Charles C Thomas, Publisher, 1954, pp. 451-453.

Simplicity in Medical Writing

THERE has always been a need for the concise and simply written medical paper. This, however, is not as simple as it seems, because the moment the physician puts pen to paper he is no longer the plain-spoken, kindly practitioner of the art of medicine, but an entirely different person. He becomes ultra-scientific and on occasion may find himself in a miasmatic labyrinth of gobbledygook. Chesterton's advice—"To write simply is the essence of good English"—is easily forgotten.

It is not necessary to begin with the statement that the subject is interesting. It is up to the writer to prove that. It is best to begin with a brief statement as to

what it is all about, and then get on with the subject matter.

Historical asides should be brief and not put in the introduction. Several paragraphs farther on, if the reader is tiring, a well written, compact bit of history may stimulate his interest.

The observation that the scientific knowledge of the ancients was obscure has no place. Everyone knows that, and no apology need be made for men of bygone ages, who in some respects were better observers than the physicians of today. They possessed the virtue of presenting their thoughts briefly and clearly.

Bibliographic notes are always dreary furniture. It is the

toms among those whose task it is to heal diseases, not spread them.

Every passing year sees at least fifty of these misbegotten words and phrases, the parvenus of language, usurp the places of their betters. Meanwhile, the old gate-crashers are still with us: redundancy (*red in color, square in shape, soft in consistency, pathologic in nature*): misdefinition (*pathology for lesion or disease, surgery for operation, case for patient*) ("this case was tightly bandaged and early next morning gave birth to a healthy child"); grammatical torts and malfeasances (a contrast media, this data, one criteria); hamstrung syntax ("cerebral palsied cleft palate and harelip patients"); verbosity—or, if the verbose prefer, logorrhea ("the pathological findings present were associated with an additional pathology indicating the presence of a possible postmeningitic syndrome in addition to the original pathology") and, finally, the never-failing floodtides of professional jargon, a sort of mental shorthand that defeats the very purpose it was invented to fulfill. "I operated this patient under general anesthesia" appears in at least six of every ten manuscripts received by the editor of any surgical journal. According to Webster, the verb "operate," used without "upon," whether applied to a patient, a machine or a corporation, means to conduct, to carry on, to cause to run. It follows, therefore, that only God can operate a man. Furthermore, if the surgeon actually did operate under general anesthesia, as his diction and punctuation suggest, Heaven

help the patient! One surgeon, according to a recently published handbook (*The Physician-Writer's Book*, by Richard M. Hewitt) claims to have gone still farther; he performed the operation in the knee-chest position. This is what the *New Yorker* would call the neatest trick of the week.

One might reasonably suppose—there is plenty of evidence—that straightforwardness and simplicity in medical writing had been officially banned. Who, then, imposed the ban? Not the editors, certainly, who labor daily against these assaults on the language. Not the reader, just as certainly; faced with those massed batteries of polysyllables, he confines himself more and more to the reading of abstracts. Even here he is in danger, for the abstractor too often is bitten by that coldest of monsters, the meaningless jargon which the style of the moment apparently accepts as a scientific ideal.

One of the best pieces of prose in English is Hilaire Belloc's *The Mowing of a Field*. If the young doctor were to keep this at his side, he would catch the rhythm, flow and beauty of words and would find it a great help in making his medical writing sparkle with meaning and clarity.

If such a ban exists, then, it is self-imposed by the authors, and only they can remove it. Is it going too far to suggest that even they might find its removal a relief?

—JOHN J. RAINEY, M.D., F.A.C.S.,
F.I.C.S.
Troy, New York

the surface of the cord was grossly deformed and herniated into the thickened membrane. Small islands of glial tissue could thus be seen but no myelin sheaths were observed within them. The vessels of the pia were large and distended with blood. Small vessels with thickened walls were also present in and about the glial band above described.

3rd lumbar segment (fig 12) A well marked triradiate cavity was present, lying mainly at the base of the right posterior column and along the right posterior horn. Its wall was composed of a thick layer of glia, the axes of the cells being set at right angles to the length of the cavity. These cells were identical in appearance with those observed in the upper cavity. A thin line of condensed glia lay at the margin of the cavity. In this line and superficially, small cells were present, somewhat discontinuous in distribution and superficially resembling ependymal cells. This interpretation was not given to them, however, as their cytoplasm was scanty and they seemed more to resemble glial cells. They had possibly

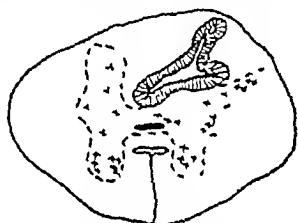


FIG 12 —Cross section of cord at level of 3rd lumbar segment
Note the reappearance of the slit

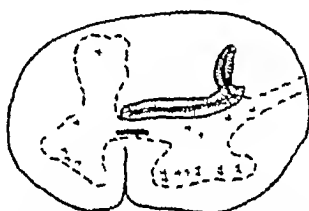


FIG 13 —Cross section of cord at level of 5th lumbar segment

been orientated in a direction parallel to the direction of the cavity, which was here wider than elsewhere. The tissue of the posterior horn, showing normal myelin sheaths, reached the margin of this glial wall. Both anterior and posterior columns were well developed. The nerve cells appeared normal but the pia was thickened. This could be observed on all aspects, although not reaching the degree observed in the segment previously described. The margin of the cord was invaded in certain areas so that in places the pia seemed to be reduplicated, an area of glial tissue lying between the two layers. Vessels were not prominent nor did the nerve roots show evidence of degeneration. The cavity of the central canal was again represented by a wide band of cells in the region of the gray commissure.

5th lumbar segment (figs 13 and 14) An L-shaped slit traversed the cord just dorsal to the gray commissure. Its shorter limb turned dorsally at right angles near the region of entry of the right posterior root zone. Its wall was as already described. The central canal was represented by a long transverse band of cells unconnected with the cavity. The nerve cells were everywhere

Le Traitement Chirurgical des Hernies de l'Aine chez l'Adulte (The Surgical Treatment of Inguinal Hernia in the Adult). By Henri Fruchaud. Paris: G. Doin et Cie, 1956. Pp. 386, with 210 illustrations.

Prof. Fruchaud points out that the Bassini operation, including its various modifications, is followed by recurrence in 2 per cent of cases of indirect inguinal hernia and 14 per cent of cases of direct inguinal hernia. The percentage of recurrence is highest in patients over 25 years of age (10-15 per cent from 25 to 35 and 30 to 40 per cent after 45).

The book is divided into five parts. Part 1 is a critique of the Bassini operation and its numerous modifications (Zimmerman, Andrews, Berger-Halsted). The author states that hernias cause distortion of the deeper structures of the inguinal canal. He points out that current operations limited to repair of the inguinal canal and rings, and even corrective operations, are insufficient. He describes the technic he has devised for total reconstruction of the inguinal region.

Part 2 is devoted to troublesome complications of herniotomy: (1) infection of the wound, which delays healing, favors recurrence of hernia and results in an ugly scar, and which can be prevented by rigid asepsis and careful handling of tissues, and (2) cellulitis and phlebitis resulting in testicular infarct and embolus formation. These can be prevented by careful dissection without trauma to the deeper vessels and resection of the sac without removal of the part adherent to the cord. Operative repair should be performed so as to assure sound healing.

Part 3 describes the technic of the author's operations designated as 1 and 2. The first two stages are the same for the two procedures and consist of: (1) adequate exposure of the inguinal region and (2) careful dissection, mobilization of the cord and correction of the peritoneal defect. The third stage consists of reconstruction of the abdominal wall with two rows of sutures—one superficial and one deep—below the cord,

uniting Cooper's ligament and the deep transversalis and external oblique fascia and thus obliterating Hesselback's triangle. In some instances it is difficult to utilize the transversalis fascia because of its insufficient length. This defect is overcome by inserting a layer of nylon mesh and suturing its inferior border to Cooper's ligament, thereby reinforcing the transversalis fascia. Nonabsorbable sutures are employed throughout, i.e., silk, linen, cotton or stainless wire.

Part 4 deals with operations designated as 3 and 4, devised for simplified reconstruction of the inguinal canal in debilitated old men, and women, and by the technic used for repair of femoral hernia.

Part 5 is a correlation of the author's results after operations 1 and 2. There have been no recurrences in 200 herniotomies, 30 of which were performed as long as four years ago. One-third of the patients were between the ages of 40 and 75 years; 35 presented recurrent hernias; 11 had massive hernias adherent to the large intestine. The author attributes success to his technic, which obliterates the offending funnel-shaped peritoneal depression, thus reinforcing the lower abdominal wall. The repaired peritoneum forms a solid resistant plane that does not bulge upon coughing and prevents the recurrence of hernia.

The book is, in short, a full presentation of the author's perfected technics for herniotomy. It has 210 illustrations by Arnold Moreau and an extensive bibliography of over 500 references. Surgeons interested in herniotomy will find much helpful information in this volume.

CHARLES PIERRE MATHE, M.D.

Synopsis of Gastroenterology. By R. Schindler. New York and London: Grune and Stratton, 1957. Pp. 395.

The *Synopsis of Gastroenterology* was written specifically for the general practitioner and the internist. The intern and resident will also find much of practical value in it.

if it can be shown that their origin depends on certain common developmental factors

It may be stated forthwith that the walls of the cavities here described are unlike the walls of the usual cavity resulting from degeneration within an area of gliosis, they have more an organoid form and possess a uniform architectural arrangement in which the axes of the cells and processes are set at right angles to the surface. Moreover the individual cells, unlike cells bordering on an area of degeneration, stain strongly with glial stains. Nor can the cavities be better explained as being derived from an exudative process resulting from the presence of a contiguous tumour mass. The lower cavity, which is similar in appearance, is unrelated to any tumour. Furthermore in the walls of cavities of this type associated with tumours the axes of the cells lie parallel to the direction of the wall rather than at right angles. Although the possibility that the cavity may have arisen from some degenerative process cannot be entirely excluded, it seems more probable that a definite anatomical structure here exists. As no such structure is present in the normal adult cord we may suspect some anomaly of development.

A superficial glance at a section of the cord containing the lower cavity brings to mind such well known diagrams in embryological treatises as illustrate the development of the central canal and its relation to the cord. It might therefore be thought that these cavities represent a failure in obliteration of some part of this canal. The developing canal, however, is an extremely small structure, and although the cavities may have been derived from it, they are far too large to represent a simple lack of closure. At least they must have possessed a capacity for further independent growth.

An examination of the wall seems to give the key to its origin. It resembles somewhat the ependymal zone of the developing cord in that it is composed of elongated polar cells set at right angles to a central canal. The cells of the ependymal zone give origin to neuroglia and, at a later date, to ependyma. As the walls of the central canal become approximated during development, certain of these cells are included in the dorsal raphe while others enter into the formation of the substantia gelatinosa. Although the type of cell entering into the cavity wall bears some resemblance to the supportive spongioblasts of the ependymal zone, they are more mature in that they have developed fibrils. It must be remarked that this is just the type of cell that one might expect to develop should a portion of the ependymal zone become isolated and undergo independent maturity.

The glial formation observed in these cavities seems almost identical with that in the case of syringomyelia described by Mackay and Favill (1935)

fore, the value of biopsy, which in 90 per cent of the cases sheds light on the question.

The particular course of osseous tuberculosis and its resistance to therapy in prisoners of war who were sent home only after many years of captivity and who were suffering from severe intestinal dystrophy is, according to Glogowski (K 11), due not so much to a protein deficiency as to both a vitamin deficiency and the development of a pathologic intestinal flora. This accounts for the fact that chemotherapy has been successful only when combined with large doses of vitamins.

Also, in cases of simultaneously existing pulmonary tuberculosis, modern antibiotics make possible a successful operation on the foci of bone tuberculosis (Daubenspeck and Jentgens, M 1).

Tuberculous spondylitis is often difficult to differentiate from tumors (Bette, M 232). This difficulty can be cleared up, however, by exact reading of the roentgen picture in combination with hematologic examinations, electrophoresis and sternal puncture.

Spondylitis anterior superficialis may be present in paravertebral abscess formations as well as in progressive infiltrative inflammation (osteoperiostitis tuberculosa). Crossing of the lumbodorsal edges is possible from above or below. Relapse of a superficial focus is to be explained as a warning sign of reduced resistance (Jentschura, M 248).

Surgical clearance of vertebral foci, when combined with chemotherapeutic rinsings, according to Kastert and Orell, indicates great progress and is suggested for all circumscribed processes (Rathcke, M 29, and Schulze, C 79). In order to obtain sufficient concentration on the foci in old processes not suitable for operation, Rossler (F 1246) inserts a permanent cannula and washes out the focus with tuberculostatics in combination with fibrinolytic ferments and hyaluronidase for simultaneous removal of the necrotic masses.

Weil and Fründ (C 49) treat *coxitis tuberculosa* with ischiofemoral arthrodesis according to Brittain. In cases of large foci they prefer the clearance of the foci combined with spongiosa plugging. Lerach (M 7) also obtained good results by this method when employed for the upper extremity.

Lentz (q.v.) presented a survey of the application of autoplasmic, homeoplastic and heteroplastic bone transplants, according to his own experimental and clinical observations, evaluating them in that sequence. Deep refrigeration he deemed superior to other conservative methods. (For further papers on the use of spans, see the section on traumatic surgery.)

A paper by Hackenbroch and Rutt (H 1539) dealt with conditions due to *poliomyelitis*. For gluteal paralysis, they recommended subtrochanteric osteotomy. They emphasized the importance of operative stabilization in cases of paralytic scoliosis.

For the so-called *habitual shoulder luxation*, Russe (R 128) recommended the Bankert method.

Baumgart (A 1115) uses a modified form of the Finsterer surgical technic according to Schutze. The pars clavicularis of the pectoralis muscle is carried out below the head of the upper part of the arm and is fixed at the posterosuperior part of the acetabular cavity. In his opinion the Bankert operation is far more difficult and sometimes results in relapse.

Bohler and Aichner (R 117), Grewe (A 1210) and others reported good results from the local application of hydrocortisone. Moreja (M 58) advocates adherence to the Hohman operation because, in his opinion, the cause of the ailment lies in a changed cubital angle.

Witt (C 488) recommended, for the treatment of clinical supracondylar fracture of the humerus, fixation by Kirschner wire as frequently done at the M. Lange School. The great advantages are an ideal reposition, minimal operative intervention, the possibility of early mobilization, and the avoidance of disturbances of growth. Bohler (R 242) recommended the crossing of the drilled wires. If the wires have to be drilled through the epiphysis, they may cause a disturbance of growth if they remain in situ too long. In this event it will be a question not only of blocking but of damage to the epiphyseal cartilage (Duben and Gelbke, M 108). For this reason, early removal of wires is mandatory (see also Witt, C 488).

On the strength of their histologic studies,

and narrow and may end in a conical enlargement on a blood vessel. The presence of short rods or granules in the blepharoplasts indicates the ependymal nature of the cell.

In discussing tumours of an ependymal nature, Roussy and Oberling (1931) divide them into two classes, the ependymoblastomes, embracing the two types described by Bailey and Cushing (1926), and the ependymogliomas, characterised by cells of an ependymal type in association with astrocytic neuroglia. They remark that the latter tumours are generally small and to be observed in the region of the fourth ventricle and aqueduct, and notably in the region of the bulb and spinal cord, where they give rise to syringomyelic cavities. They believe that one or other element may preponderate in any individual tumour and that ependymal elements may be transformed into neuroglia.

Many of the ependymoblastomata which I have observed have preserved the exact form described by Bailey. Others have shown the same architectural arrangement and relation to blood vessels, yet undoubted fibrils were present within their cytoplasm. I have also observed areas of ependymoma, ependymoblastoma and astrocytoma within the same tumour, with obvious transitions between the so-called ependymoblasts, polar neuroglia and astrocytes (Cox, 1933).

The cells of the ependymoblastoma show, therefore, a degree of differentiation from a type resembling a supportive spongioblast to one possessing the attributes of a fibrillary astrocyte. The original distinction of these tumours as of ependymal origin does not depend upon the arrangement of the cells about vessels but upon other factors. Thus certain of the cells were noted to resemble normal ependymal cells, to be arranged in tubule formation and to contain blepharoplasts. Moreover the site of origin of such tumours is usually the vicinity of a ventricle.

It is obvious that a polar cell of which one process is attached to a vessel wall is differentiating rather towards an astrocyte than towards ependyma. The human adult ependymal cell is derived from a polar cell of the ependymal zone by the loss of the process adjacent to the central canal or ventricle. This same cell, should it not lose this process, becomes of neuroglial type, although not necessarily assuming the asteroid form. So it would seem that such glial cells with their fibrils may be closely related to ependyma. It is interesting to note that Roussy and Oberling describe a form of glioma containing polar cells with particularly large fibrils as a "gliome sous-ependymaire". Incidentally this tumour has much in common with one described by Bailey as a polar spongioblastoma, which, as noted elsewhere by the author (Cox, 1933), has much in common with the astrocytoma. It has also been recently shown by Russell and Bland (1934) to give origin to glioma of asteroid form on tissue culture. As the relation of glioma to ependyma is close in all mammalian forms, it is not surprising that the ependymoma

am 1. HWK and 15 Kg. am 7. HWK).

The application remains unsuccessful if there has been immediate flaccid paralysis, or if there is priapism, which, among other symptoms, indicates total severing of the cerebral portion of the spinal cord. The method has also proved successful with pathologic luxation of the atlas and, exceptionally, with compression of the vertebral portion of the spinal cord associated with severe scoliosis, with fractures of the lumbar portion of the spine and with spondylitis tuberculosa, particularly when employed in preparation for surgical intervention.

Lindemann (M 540) expressed the opinion that *juvenile kyphosis* is associated with a developmental disturbance in the chorda and therefore, with dysostosis enchondralis. After extensive roentgenologic and histologic investigations, Reske (M 489) attributed an essential significance to the paravertebral tissue shadow in the development of scoliosis. That shadowy outline, in his opinion, is caused by inflammatory and reactive changes in the retro-aortal subpleural connective or adipose tissue in connection with the pleura, and represents an active and passive force hampering growth.

Wilhelm (M 221) discussed the possibility of intrauterine epiphyseal damage to the vertebral column caused by anomalies of position and by oligohydramnios in connection with prenatal disorders. He advocated early treatment by means of a posterior shell or gymnastics. In the opinion of Felix (M 446), attempts at removal, alleviation or elimination of scoliosis by rib plastic procedures are abortive, according to postoperative examination, since it is impossible to compensate for the torsion. He predicted improvement from a combination of those interventions with use of spans of the vertebral column by the Lange method. Scheuer reported (M 48) 4 cases of scoliotic paralyses due to a transverse lesion, which he was able to cure respectively by conservative treatment and laminectomy respectively. The paralyses occurred at the time of greatest development. This observation supports Lange's demand for surgical intervention in cases of progressive scoliosis.

According to Weil (G 1129), sciatica in

many cases is the result of pressure damage to the nerve cells within the vertebral canal. Medial prolapse of the root produces sciatic scoliosis on the opposite side. In cases of scoliosis with lateral prolapse the vertebral column is averted to the side of the prolapse (representation of distance). For operation on the *prolapsed lumbar disc*, Schroder (A 1785) recommended peridural anesthesia (eleventh and twelfth thoracic for soft tissue and fifth lumbar-first sacral for the nerve roots). The ligamentum flavum should always be fenestrated to provide enough room for the roots. Only loose or disconnected segments of disc tissue should be removed.

According to Penholz (D 120), the results of surgical intervention are the better the more exactly the loose and disconnected tissue is removed. Various methods are employed in the use of contrast media in the vertebral canal to diagnose prolapse of a disc. Stirnweis (C 120) expressed the opinion that scout films suffice for diagnosis and for determining the level of the prolapse. Kloss (B 91) recommended functional myelographic study because it delineates also labile prolapse, he believes as well, in his opinion. Reinhardt (O 809) and Koberg (O 236) recommended abradil for myelographic study. Panter, in collaboration with Reinhardt, wrote a special treatise on the contrast method as applied to the apical sac and its variants, e.g., discographic and peridurographic study. Decker (F 1691) emphasized the fact that suboccipital gas myelographic study with elevation of the pelvis offers excellent possibilities for diagnosis of tumors of the spine and prolapse of the discs, agreeing with Pia (O 170) as to the simplicity and safety of this method. If there is reason for suspecting a tumor, Reinhardt, too, has expressed preference for gas myelographic study.

Lower Extremities.—Hohmann (G 54) pointed out that many failures in the treatment of the so-called *congenital hip luxation* are due to belated treatment. He insists on early treatment combined with rotation osteotomy later. According to Penners (R 393), this luxation can be diagnosed within the first four weeks, because the Perrin-Ferraton disease appears whenever the hip

this zone suggests that it represented an attempt to isolate the syringomyelic ghosis. Should this fibrosis and vascularisation have become more marked and the ghosis have undergone the degeneration so common in this type of tissue, the wall of the cavity would have been composed of connective tissue and vessels in place of glia.

III

In the upper thoracic segments of the cord alone were there appearances which suggested the presence of a myelitis of acute or subacute origin. Here a certain amount of perivascular round-celled infiltration was observed, together with a few glial nodes. It is possible of course that this process was terminal and associated with the pneumonia.

IV

It is to be noted that the clinical course of this condition was unlike that usually observed in syringomyelia. In particular the phenomenon of dissociated anaesthesia was lacking. All forms of sensation were affected over the right lower lumbar segments and the corresponding knee jerk could not be obtained. The position of the cavity together with its lack of distension clearly explains this anomaly. Thus the dorsal root zones were disturbed over several segments while the white commissure was spared. The spread of anaesthesia and the loss of muscular power occurring at a later date may be attributed to the development of the tumour or to changes in the adjacent cord.

Nystagmus, although common in syringomyelia, was a late sign. It is usually regarded as resulting from interference with the descending vestibular nucleus or its connections with the longitudinal bundle of the opposite side. This relationship could not be studied in this case.

It is notable that this patient had always tired easily. Five years previously, after an injury to her back, she had not only experienced symptoms attributable to disturbance of the lumbosacral segments, such as numbness in the lower part of the body and in the buttocks, with disturbance of defaecation, but symptoms which must have originated in a more highly placed lesion. Thus she suffered from pains in the back and arms, numbness in the left arm and left side of the trunk and dragging of the left leg. Such phenomena must have been associated with the upper cavity or with the neighbouring tumour present at that period.

V

Trauma has been suggested as the exciting cause of the onset of symptoms in syringomyelia in a considerable number of cases. It is not unlikely that injury may result in hæmorrhage in or about

of the meniscus. The cause of this change, not hitherto observed, is still hypothetical. The most likely explanation is a connection with the vessels. In order to prevent relapses, total extirpation is necessary. Hartung (R 149) expressed the opinion that meniscus ganglion is caused by fibromatous or myxomatous proliferation of the tissue along the parameniscal marginal arteries. Albert (O 282) pointed out the typical changes visible in roentgen pictures of the meniscus. He demonstrated pressure defects, impressions, and circumscribed punched-out areas at the caput tibiae, which are to be explained by pressure of the ganglion on the bone.

In operation for lesions of the meniscus, Stelli (C 97) advocated resection, in order to prevent arthrosis. Because of evidence of regeneration of the meniscus, Hagemeyer (A 1087) also suggested resection, *provided* the remaining part is intact.

In post-traumatic effusions of the knee joint, Brandes (G 1467) and Heise (G 1185) noticed good results from the use of hydrocortisone (prevention of excessive reactions of mesenchyma; antiphlogistic and antiproliferous effects).

Operation for *injured collateral ligaments* gains more and more in importance. Mayr (P 216) emphasized the good results gained by central displacement of the proximal appendage of the ligament according to Lange-Ruther (E 148) who agree on this point. Lange (P 216) emphasized the fact that plastic repair of collateral ligaments is simpler and more successful. Ehalt and Ohl (R 79) even expressed themselves in favor of early operation, in which the torn ligament parts have to be fixed with thin wire sutures at the right place.

He opposed utilization of the meniscus as a substitute for the ligamentum cruciatum. He employs a fascial plastic procedure or, in cases of only partial plastic intervention, fixation of the torn ligament within a bone canal by means of silk-bridle sutures. An injured meniscus is not stable enough, a healthy one is too valuable (Mayr, P 216). In re-examining patients operated on according to Lange, Mayr observed good results in 90 per cent of the cases. Rathke (M 29) recom-

mended the Lindemann method, i.e., use of the gracilis or semitendinosus tendon with attachment to the ligamentum patellae. Janik has offered an instructive survey of injuries to the ligamentum cruciatum and their treatment.

In treatment of *crushing fractures of the patella*, extirpation yields better results than does the attempt at restoration (Schönbauer, R 266; Ender, P 207).

Schlüter and Mey (M 42) described a hitherto unobserved location of *aseptic bone necrosis*—the joint surface of the tibial head. In their opinion it was connected with persisting osseous nuclei.

Clubfoot should be treated as early as possible (Hohmann, G 54; Bosch, P 149). According to Bosch, a modification of the Kite method has turned out well. It calls for approaching all components simultaneously, with the exception of the talipes equinus. The talipes equinus should be the last, and, whenever possible, it should be overcorrected. If conservative treatment fails, operation is indicated, which also applies to relapses.

Hauberg (P 156) recommended achillotomomy together with severing of the posterior capsule and the medial ligament apparatus, and "fanning out" of the tibialis posterior muscle. Transplanting the tibialis anterior to the dorsum of the foot is rarely necessary, according to him.

In the treatment of talipes after the twelfth year of age, suztalar arthrodesis with wedge osteotomy is the preferred method (Hopf, P 162).

For "hollow foot," Löffler (A 778) recommended operation on the soft tissue during childhood; if done later, he suggested tangential chiseling off the high instep. For *ball hollow foot*, there should be additional resection at the bases of the first metatarsals. For *spread hollow foot* a cutis-strap plastic, with ligation of the first and fifth metatarsals, is preferable.

For the treatment of *act. flatfoot*, Endler (M 181) recommends *active* methods and transplan *tive* as *ei* On the o *ei* 2 r a t t

- | | | |
|---------------------------------|------|---|
| RAMÓN Y CAJAL, S | 1933 | Histology, revised by J F Tello Muñoz, translated from the 10th Spanish ed by M Fernán Nuñez
<i>London</i> |
| ROUSSY, G , AND OBERLING, C | 1931 | Tumeurs des centres nerveux et des nerfs périphériques, in Atlas du cancer, fasc 9/10 <i>Paris</i> |
| RUSSELL, D S , AND BLAND, J O W | 1934 | this <i>Journal</i> , <i>xxix</i> 375 |
| SCHLESINGER, H | 1902 | Die Syringomyelie, 2nd ed , <i>Leipzig and Vienna</i> |
| TURNBULL, F A | 1933 | <i>Bram</i> , <i>li</i> 304 |

cent. Different methods of treatment are (1) conservative treatment with withholding of food (Dörfner); (2) conservative treatment with provision of food (Meulengracht), and (3) radical resection (Finsterer).

Schwarz (A 449) reported on late results after *gastric resection*, with anterior and posterior anastomosis. Of the 170 resections, 50 per cent included anterior and 50 per cent posterior gastroenterostomy. The two methods produced identical results.

Ullrich (A 745) explained his position in cases of total and "enlarged total" gastric extirpation and the duration of survival for patients operated on with this technic. He strongly urged total gastrectomy in all cases of scirrhus, carcinoma fibrosum and linitis plastica, pointing out that the abdominal approach is almost always sufficient. As anastomosis the esophagojejunostomy is adequate. For a high lying carcinoma of the cardia he recommended approach through the two cavities. With regard to the period of survival, the progress is still poor.

Nakayama (C 266) presented an estimate of the different operative technics for total gastrectomy, taking into account his own 260 cases. His conclusions were as follows:

1. The direct esophagoduodenostomy is practicable only if there is no great occlusion at the point of anastomosis. Sustaining sutures have to be applied between the diaphragm and the head of the pancreas. With this technic the mortality rate amounts to 2.2 per cent.

2. The interposition of different intestinal loops between the esophagus and the duodenal stump is technically difficult and means an additional operative burden for the patient. It is the best method, however, for the physiologic mechanism of digestion, because the transplanted loop takes over the stomach's function and the passage through the duodenum remains open. The mortality rate of this method is zero.

3. In esophagojejunostomy the passage of chyle through the duodenum is eliminated, which is disadvantageous to digestion. With this technic the mortality rate is 2 per cent. Sustaining sutures have always to be applied for the purpose of unburdening the anas-

tomosis. Suturing of the anastomosis must be performed in two layers. Postoperative complaints of difficulty in swallowing are due to scar strictures or relapses. Scar strictures are present with esophagoduodenostomy in 43 per cent of cases; with esophagojejunostomy, in 31.8 per cent and in operations done by joining intestinal loops, only 11.1 per cent.

After presenting indications for total extirpation of the stomach, Nakayama (C 277) described his own method. He resects the pancreas at the crossing point of the medial colic artery, simultaneously cleaning the celiac lymph nodes.

He investigates beforehand the possibility of operation by means of transperitoneal splenovenographic studies. Stenosis and passive congestion of the splenic vein prove the carcinoma inoperable (irruption into the retroperitoneal region). The mortality rate associated with this method is 2.05 per cent.

To avoid rapid evacuation after total gastric resection, Mandl (P 403) performs two Braun's anastomoses, one located behind the other, below the esophagojejunostomy. Rainer and Zollner (D 371) observed 59 cases of anemia after total gastrectomy. They recommended treatment by administration of vitamin B₁₂ and iron.

For carcinoma of the fundus with extension in the direction of the cardia and for genuine cardiac carcinoma, Holle and Heinrich (C 164) advocated the two-cavity operation according to Lewis Ivor, with esophagoantrostomy. They approach by their own method, however, an isolated tumor in the fundal area, i.e. They resect the superior gastric segment and perform a subdiaphragmatic esophagoantrostomosis. The same is true of an ulcer near the cardia. Subdiaphragmatic fundectomy is performed by abdominal removal of the superior gastric segment and the establishment of an end-to-end anastomosis between the intra-abdominal portion of the esophagus and the remainder of the pyloric segment. In order to insure adequacy of the anastomosis, the esophageal rami of the left gastric artery and the left caudal phrenic artery must be preserved at all costs. The blood supply of the esophagus, coming from below, extends as far as 3 cm. above the diaphragm.

Whichever process operates, the presence of oxygen is of much importance, for Walpole found that *B aerogenes* produced considerably more acetylmethylcarbinol from glucose under aerobic than under anaerobic conditions, and that the yield of carbinol by this organism from a medium containing 2 3-butylene glycol but no glucose was greater in the presence of free oxygen than in its absence. O'Meara (1931) found that the strength of the V-P reactions of 48-hour cultures was increased by the addition of hydrogen peroxide, if followed by further incubation for 24 hours, and held that this was due to oxidation to acetylmethylcarbinol of the previously reduced 2 3-butylene glycol. Brockmann and Werkman (1932-33) believed that acetylmethylcarbinol and 2 3-butylene glycol do not form a reversible oxidation-reduction system, for they found that the addition of methylene blue or o-chlorophenol-indophenol as hydrogen acceptors to a number of anaerobic cultures containing glucose caused no increased yield of acetylmethylcarbinol and no diminution in the amount of 2 3-butylene glycol.

The action of various bacteria has been tested in a medium consisting of 2 3-butylene glycol (0.5 per cent), NaCl (0.5 per cent) and Difco Bactopeptone (1 per cent), which was distributed in $6 \times \frac{5}{8}$ in test tubes in 5 c.c. quantities and autoclaved at 10 lb for 20 minutes (final pH 7.4). Sterilisation by filtration was found unnecessary. After inoculation from nutrient broth cultures and incubation for 18 hours at 37° C. positive reactions were given in the α -naphthol test by strains of *B. coli*, *B. aerogenes*, *B. typhosus*, *B. paratyphosus* A, *B. paratyphosus* B, *B. gaertner*, *B. aertrycke*, *B. newport*, *Br. melitensis*, *Br. abortus bovis*, *Br. suis* and *C. diphtheriae*. With the exception of the brucellas and the corynebacteria, which required a longer period of incubation as their growth was slow in this medium, these strains gave brilliant red colours in the test and the ordinary V-P and the creatine modification (O'Meara) were positive in most instances. As the reactions of strains of the supeptifer and dysentery groups varied, a number of these organisms were examined and in the supeptifer group positive results were given by Eastern European diphasic strains (5) and *B. veldagsen* (Dammann), and negative by Eastern European diphasic (1), *B. typhi suis* (Glasser), American diphasic (3) and Western European monophasic (6). In the dysentery group positive reactions were given by *B. shiga* (5), *B. sonne* (5), *B. dispar*, *B. newcastle* and *B. flexner* (original Y of Hiss and Russell), and negative by *B. flexner* (w₁, v₂, v, w, x, y and z) (12) and *B. schmitz* (2). All the negatives were colourless after 18 hours' incubation, but if the incubation period were prolonged to 3-4 days most of them gave a weakly positive (pink) reaction. Of chief interest, however, were the findings with the *coli-aerogenes* group of bacteria in which all

with a glance at the pathophysiologic aspects of the subject. According to the world medical literature, the average mortality rate is 8.6 per cent.

Peritonitis as a cause of death has declined sharply. Among 800 operations performed by Block on the extrahepatic bile ducts, the mortality rate for men was 80 per cent and for women 12.1 per cent. Before operation, functional tests of the liver and kidneys must be made, since the hepato-renal syndrome may occur. Block described the clinical picture of that syndrome and of diseases in which hepatic damage is in the front rank: hepatic crisis, hepatic coma, hepatargy and other conditions are included in the hepatorenal syndrome. Disturbances of function of the extrahepatic bile ducts, the so-called dyskinesia: *nervi splanchnici* increase the tonus and motility of the bile ducts, while the vagus acts in the opposite manner. There is confusion as to whether the sphincter of Oddi in the gallbladder neck (Lütgens) acts synergistically or antagonistically. After cholecystectomy, irritability of the sphincter of Oddi may persist. Block refuses to operate on the vegetative nervous system in case of dyskinesia of the bile ducts, recommending a procaine block from the ninth to tenth thoracic level on the right side.

Contrary to this opinion, Rosenauer (D 864) recommended that in such cases both splanchnic branches be severed below the diaphragm either retroperitoneally or transpleurally, according to Kux. One must be sure, however, that there is only a functional syndrome. Psychogenic disturbances must be excluded.

Hess (D 857) pointed out that postoperative complaints after cholecystectomy are often caused by gastritis, ulcers and colitis.

In the presence of colic and bile stasis, however, there are usually changes in the bile duct system. Their causes may be detected by intraoperative cholangiographic study, which is also recommended by Wulff (D 877).

In patients with such complaints Hess (D 857) observed stones in the bile ducts in 27.5 per cent of the cases; stenosing papillitis in 37.5 per cent; chronic pancreatitis in 10 per

cent; stenosis caused by scars in 12.5 per cent, and hepatic stenosis in 50 per cent. Papillitis was present in 59 per cent of all cases of cholelithiasis.

Hilgenfeldt (D 877), pointing out that operative cholangiographic study is not always possible in small hospitals, recommended the insertion of a T drain into the choledochus and a postoperative cholangiographic study of the area above the T drain.

Fischer (D 810) maintained that stone formation in the choledochus is possible only in cases of choledochus stenosis. With stones present in the deep bile ducts, icterus is facultative in only 60 to 75 per cent of the cases. A careful anamnesis should be taken, as well as a roentgenogram of the bile ducts with a contrast medium.

A suspected stone in the choledochus is sufficient cause for operation, but the choledochus should be opened only if there is a true indication, and a blocking stone in the cystic duct is no contraindication. According to the literature, stones in the choledochus are overlooked in 20 to 68 per cent of operations on the gallbladder.

Opening of the choledochus is imperative if (1) there are palpable stones in the choledochus; (2) there is a history of icterus or cholangitis; (3) the choledochus is dilated; (4) if small gallstones are present; (5) the ductal system is enlarged and extended and the gallbladder contracted, or (6) puncture of the choledochus reveals opacity or sand-like bile.

Fischer mentioned the value of operative cholangiographic study, which, among other advantages, makes it possible to determine the number of gallstones present. After the stones have been removed from the bile ducts with a stone spoon, palpation by probing and irrigation should be done and a new roentgenogram taken. Stones wedged in the papilla rarely call for the transduodenal splitting thereof.

Fischer (D 810) recommended choledochus drainage by T drain according to Kehr. Loss of fluid bile can be avoided (Mollowitz, D 877) by inserting an additional plastic cannula into the duodenum.

Löffler and Spohn (D 877) also recom-

and by *B coli* (Grey, 1913) and of various sugars by both organisms (Nagai, 1923), but there is no direct evidence that acetylmethylcarbinol is formed from the aldehyde by either, though Harden and Norris by adding acetaldehyde daily to an anaerobic culture of *B aerogenes* in peptone (Witte) water obtained traces of 2 3-butylene glycol after about one month's incubation

My experiments with acetaldehyde have been complicated by the fact that five samples from different firms were found to contain traces of a substance reacting in the α -naphthol test like acetylmethylcarbinol. With new specimens the reactions were weak and of low titre, being about 1 200, and concentrations higher than this gave only a yellowish or brownish colouration which may account for it having been overlooked previously (Barritt). If the acetaldehyde were distilled to about one tenth its volume the distillate was negative but the residue was positive in a dilution of about 1 2000. There was no increase in the capacity of the samples to react if they were stored in well stoppered bottles in the dark, but if evaporation were allowed to take place the substance became sufficiently concentrated to give a positive result in the ordinary V-P test. It was also found that if a 1 10 dilution were exposed in a well stoppered bottle to the light from a window for several weeks there was an increase in the strength of the α -naphthol reaction obtained, probably owing to the synthesis of acetylmethylcarbinol from acetaldehyde under the influence of light as in the irradiation experiments of Dirscherl (1930). Some specimens of paraldehyde— $(\text{CH}_3 \text{ CHO})_3$ —also showed the presence of a substance reacting like acetylmethylcarbinol, but aldol— $(\text{CH}_3 \text{ CHOH CH}_2 \text{ CHO})$ —was negative.

Cultures of *B aerogenes* and *B coli* were made in peptone water containing the different samples of acetaldehyde in concentrations of from 1 100 to 1 4000. Growth of these organisms was inhibited by concentrations greater than 1 600, but none of those in which growth took place gave a stronger α -naphthol reaction than the corresponding controls, which in the experiments with distilled acetaldehyde were negative.

It appears therefore that *B aerogenes* does not form acetylmethylcarbinol from preformed acetaldehyde under these conditions.

Pyruvic acid

The evidence as to the formation of acetaldehyde and acetylmethylcarbinol from pyruvic acid in alcoholic fermentation is conflicting and the literature on the subject extensive. It certainly seems to happen when pyruvate is fermented by yeast under some conditions (Hirsch, Neuberg and v May, 1923, Neuberg and Rosenthal), formation of acetylmethylcarbinol being favoured by

with a glance at the pathophysiologic aspects of the subject. According to the world medical literature, the average mortality rate is 8.6 per cent.

Peritonitis as a cause of death has declined sharply. Among 800 operations performed by Block on the extrahepatic bile ducts, the mortality rate for men was 80 per cent and for women 12.1 per cent. Before operation, functional tests of the liver and kidneys must be made, since the hepato-renal syndrome may occur. Block described the clinical picture of that syndrome and of diseases in which hepatic damage is in the front rank: hepatic crisis, hepatic coma, hepatargy and other conditions are included in the hepatorenal syndrome. Disturbances of function of the extrahepatic bile ducts, the so-called dyskinesia: *nervi splanchnici* increase the tonus and motility of the bile ducts, while the vagus acts in the opposite manner. There is confusion as to whether the sphincter of Oddi in the gallbladder neck (Lütgens) acts synergistically or antagonistically. After cholecystectomy, irritability of the sphincter of Oddi may persist. Block refuses to operate on the vegetative nervous system in case of dyskinesia of the bile ducts, recommending a procaine block from the ninth to tenth thoracic level on the right side.

Contrary to this opinion, Rosenauer (D 864) recommended that in such cases both splanchnic branches be severed below the diaphragm either retroperitoneally or transpleurally, according to Kux. One must be sure, however, that there is only a functional syndrome. Psychogenic disturbances must be excluded.

Hess (D 857) pointed out that postoperative complaints after cholecystectomy are often caused by gastritis, ulcers and colitis.

In the presence of colic and bile stasis, however, there are usually changes in the bile duct system. Their causes may be detected by intraoperative cholangiographic study, which is also recommended by Wulff (D 877).

In patients with such complaints Hess (D 857) observed stones in the bile ducts in 27.5 per cent of the cases; stenosing papillitis in 37.5 per cent; chronic pancreatitis in 10 per

cent; stenosis caused by scars in 12.5 per cent, and hepatic stenosis in 50 per cent. Papillitis was present in 59 per cent of all cases of cholelithiasis.

Hilgenfeldt (D 877), pointing out that operative cholangiographic study is not always possible in small hospitals, recommended the insertion of a T drain into the choledochus and a postoperative cholangiographic study of the area above the T drain.

Fischer (D 810) maintained that *stone formation* in the choledochus is possible only in cases of choledochus stenosis. With stones present in the deep bile ducts, icterus is facultative in only 60 to 75 per cent of the cases. A careful anamnesis should be taken, as well as a roentgenogram of the bile ducts with a contrast medium.

A suspected stone in the choledochus is sufficient cause for operation, but the choledochus should be opened only if there is a true indication, and a blocking stone in the cystic duct is no contraindication. According to the literature, stones in the choledochus are overlooked in 20 to 68 per cent of operations on the gallbladder.

Opening of the choledochus is imperative if (1) there are palpable stones in the choledochus; (2) there is a history of icterus or cholangitis; (3) the choledochus is dilated; (4) if small gallstones are present; (5) the ductal system is enlarged and extended and the gallbladder contracted, or (6) puncture of the choledochus reveals opacity or sand-like bile.

Fischer mentioned the value of operative cholangiographic study, which, among other advantages, makes it possible to determine the number of gallstones present. After the stones have been removed from the bile ducts with a stone spoon, palpation by probing and irrigation should be done and a new roentgenogram taken. Stones wedged in the papilla rarely call for the transduodenal splitting thereof.

Fischer (D 810) recommended choledochus drainage by T drain according to Kehr. Loss of fluid bile can be avoided (Mollowitz, D 877) by inserting an additional plastic cannula into the duodenum.

Löffler and Spohn (D 877).

and by *B. coli* (Grey, 1913) and of various sugars by both organisms (Nagai, 1923), but there is no direct evidence that acetylmethylcarbinol is formed from the aldehyde by either, though Harden and Norris by adding acetaldehyde daily to an anaerobic culture of *B. aerogenes* in peptone (Witte) water obtained traces of 2 3-butylene glycol after about one month's incubation.

My experiments with acetaldehyde have been complicated by the fact that five samples from different firms were found to contain traces of a substance reacting in the α -naphthol test like acetylmethylcarbinol. With new specimens the reactions were weak and of low titre, being about 1/200, and concentrations higher than this gave only a yellowish or brownish colouration which may account for it having been overlooked previously (Barritt). If the acetaldehyde were distilled to about one tenth its volume the distillate was negative but the residue was positive in a dilution of about 1/2000. There was no increase in the capacity of the samples to react if they were stored in well stoppered bottles in the dark, but if evaporation were allowed to take place the substance became sufficiently concentrated to give a positive result in the ordinary V-P test. It was also found that if a 1/10 dilution were exposed in a well stoppered bottle to the light from a window for several weeks there was an increase in the strength of the α -naphthol reaction obtained, probably owing to the synthesis of acetylmethylcarbinol from acetaldehyde under the influence of light as in the irradiation experiments of Dirscherl (1930). Some specimens of paraldehyde— $(\text{CH}_3\text{CHO})_3$ —also showed the presence of a substance reacting like acetylmethylcarbinol, but aldol— $(\text{CH}_3\text{CHOHCH}_2\text{CHO})$ —was negative.

Cultures of *B. aerogenes* and *B. coli* were made in peptone water containing the different samples of acetaldehyde in concentrations of from 1/100 to 1/4000. Growth of these organisms was inhibited by concentrations greater than 1/600, but none of those in which growth took place gave a stronger α -naphthol reaction than the corresponding controls, which in the experiments with distilled acetaldehyde were negative.

It appears therefore that *B. aerogenes* does not form acetylmethylcarbinol from preformed acetaldehyde under these conditions.

Pyruvic acid

The evidence as to the formation of acetaldehyde and acetylmethylcarbinol from pyruvic acid in alcoholic fermentation is conflicting and the literature on the subject extensive. It certainly seems to happen when pyruvate is fermented by yeast under some conditions (Hirsch, Neuberg and v. May, 1923, Neuberg and Rosenthal), formation of acetylmethylcarbinol being favoured by

mends examination for hypercorticism and retroperitoneum. In 3.3 per cent of the cases there were renal cysts, in 0.67 per cent, adrenal adenomas, and in 1.7 per cent, hypernephroid tumors. In 25 per cent of the male patients with "essential" hypertension there was an adenoma of the neck of the bladder, in 2 per cent, diffuse prostate hyperplasia, and in 1.4 per cent, primary rigidity of the sphincter.

In addition, there were cases of mural stenosing walls and changes in the lumen of the main renal artery, resulting in choking hypertension.

Fikeis (T 38), writing of the unilateral cystic kidney, and Rodeck (T 751) discussing ureteritis cystica, described *hypertonia* caused by unilateral renal disease.

Behind a disease resembling nephritis, with a myelotic blood picture and an increased nitrogen level, there may be hidden a primary latent renal damage with myelotic reaction, or leukemia with secondary renal damage, or leukemia without renal damage but with increased cellular disintegration (Otto, T 775).

The *Rehn acid-base test* of topical renal function may be simplified, according to Peters (C 157), by using *planoparallel* colored glasses to determine the pH. Schmiedt and Löw (T 673) stated their faith (next to the usual functional tests) in the clearance test, especially for prostatic and hypertonic conditions. In such cases, they stated, the half-time value method of Dost is sufficient if shortened to half an hour and if an indwelling catheter is not used.

Schimatzeck (T 737) mentions that in *retrograde pyelographic* study the lower calyx groups and the neck of the ureter are much more distinctly delineated by putting the patient in the abdominal rather than in the dorsal position. This could be extremely important in many cases. Sinner (T 564) emphasized the value of retroperitoneum for diagnosing morphologic changes in the kidneys and the perirenal area, pointing out the relatively small risk involved.

According to Alken and his co-workers (T 438), the *paper electrophoresis* is convenient for objective estimation of the activity of urogenital tuberculosis, and also for demarca-

tion of the exudative from the productive stage. They consider this method indispensable for evaluating reactions and indications for surgical intervention.

Fischer (T 743) and Reuter (T 442) reported on the cystometric and sphincterometric examination of prostatic patients. Bauer and Schmidt (T 643) reported on the same method in cases of multiple sclerosis. Niesert (T 103), Brandstetter and Gibsch (X 1272), as well as Scholz (X 466) discussed the diagnostic and therapeutic value of sphincterometry in cases of relative incontinence of urine.

Weber (T 231 resp. 424) observed that in his urologic practice, when instruments were used, the percentage of enterococci was relatively high and that with antibiotics there occurred an increase in proteus pseudomonas as well as, especially, staphylococci. He advocated, therefore, treatment by broad-spectrum antibiotics only in special cases. According to Weber, the urethra is normally inhabited by strains of staphylococcus albus that create an antibacterial hindrance and, thus, a protection from ascending infection. With antibiotic treatment the protective flora is replaced by a *pathogen-resistant flora*.

Eufinger (T 401) reported on the influence of shock and collapse on the *tonus of the urinary tract*. In the acute stage there is *detrusor hypotony*, causing spontaneous elimination of urine. In protracted cases, and postoperatively there is *hypertonia*. Diminished detrusor pressure is connected with increased pressure of the opening, while increased detrusor pressure is accompanied by diminished opening pressure of the vesical outlet. In Eufinger's opinion this functional change is due to a disturbance of vegetative innervation.

According to Gelbke (T 65), a *reflective inhibition of diuresis* of the contralateral kidney in nephrectomy is due to flat anesthesia and the formation of a hematoma in the area of the plexus close to the kidney.

Uretrocavernosographic and cavernosographic studies are recently invented roentgen methods (May and Hirtl, N 120). With injection of ioduron, 20 to 30 per cent, into the glans, the cavities of the glans and the corpus

TABLE
A comparison of the results of the *a* naphthol test with cultures of *B. aerogenes* and *B. coli* containing
varying amounts of pyruvic acid and glucose

Organism	Period of incubation (37 C.) in days	Percentages of pyruvate						Percentages of glucose					
		20		10		12		0.8		0.4		0.2	
		+	++	+	++	+	++	+	++	+	++	+	++
<i>B. aerogenes</i> 27	1	+	++	+	++	+	++	+	++	+	++	+	++
	2	+	++	+	++	+	++	+	++	+	++	+	++
	3	+	++	+	++	+	++	+	++	+	++	+	++
<i>B. aerogenes</i> 28	1	+	++	+	++	+	++	+	++	+	++	+	++
	3	+	++	+	++	+	++	+	++	+	++	+	++
	1	+	++	+	++	+	++	+	++	+	++	+	++
<i>B. coli</i> 1	1	±	±	±	±	±	±	±	±	±	±	±	±
	2	±	±	±	±	±	±	±	±	±	±	±	±
	3	±	±	±	±	±	±	±	±	±	±	±	±
<i>B. coli</i> 2	1	±	±	±	±	±	±	±	±	±	±	±	±
	3	+	+	+	+	+	+	+	+	+	+	+	+
	1	+	++	+	++	+	++	+	++	+	++	+	++

+, ++ etc indicate the intensity of the reaction

roentgen radium therapy. But only resection of the tumor offers a certain chance for curing.

With 97 esophageal operations from 1947 to 1954, Decker, Hahn, and Saegesser (U 1, 17) encountered a mortality rate of 40 per cent. They consider the operation advisable solely for cardia carcinoma, but prefer roentgen therapy in cases of genuine esophageal carcinoma. They calculated a survival of only two and two thirds months for their patients from 1939 to 1949, if they had been treated merely with gastrostomy and irradiation.

Wurnig (D 504) examined his material on 198 carcinomas, both of the esophagus and of the cardia, for mention of previous diseases that may have produced carcinoma. Among these he listed traction diverticula, lye stenosis, esophagitis with cardiospasm and the "short esophagus displacement" of the cardia into the thorax. Hiatus hernia was not included. In his opinion the origin of a cardial carcinoma as a result of a hiatus hernia is unlikely.

According to Krauss and Betke (F 465 and F 491), there is only one esophageal malformation among 1,000 to 2,000 deliveries. The most frequent is atresia, with a blind stump and a fistula stretching from the lower segment to the trachea at the level of bifurcation (carcinoma in 90 per cent of all cases). Of 12 patients operated on for esophageal deformities, only 4 could be saved. Wachsmuth (Z 209) demonstrated by color film at a meeting of German surgeons in 1955 his technic for the surgical treatment of atresia of the esophagus.

Denecke (Z 209) reported on the treatment of esophageal stenosis in an infant, 10 months old. The condition had developed after surgical removal of a congenitally atresia esophagus.

The use of bougies for such stenosis is rendered more difficult by prestenotic diverticula, and there is danger of perforation. Denecke, therefore, recommended continuous treatment with bougies, the bougie being left in the esophagus for some time. In this way the scar tissue becomes softened and is able to tolerate further dilation without trouble. This treatment should be applied only clinically.

For more exact treatment of organic or functional strictures of the esophagus, Donner and Teschendorf (Y 202) recommended the use of gelatine capsules filled with barium pap. They are of different sizes for better testing the capacity of the stenotic organ. Capsules that come to a dead stop dissolve, and in this way the passage becomes free again very soon. The authors considered the procedure highly valuable because the capsules measure esophageal lumen correctly and, in this way, clearly point to the correct treatment.

Vogel and Jacobsen (Z 214) reported their experiences in dividing the diverticulum threshold according to Mosher. Of 34 patients, each with an esophageal diverticulum, four-fifths showed improvement when reexamined. In one-fifth there was no change. No dangerous accidents, either operative or postoperative, have been observed. According to the authors, the success of endoscopic splitting of the diverticulum almost equals that of extirpation.

Nissen (H 941) called attention to the fact that complaints of dysphagia do not necessarily bear a direct proportion to the size of the diverticulum. If one examines the anamnesis in a case of small diverticula, one notes that dysphagia antedates considerably the proof supplied by roentgen and endoscopic studies. Consequently, Nissen assumed that abnormal contraction reactions of the muscles have a part in the development of the ailment and that it is even likely that they are responsible for its developing.

Ott reported the bridging of an esophageal stricture by utilizing a pulsating diverticulum of the esophagus.

Peter (A 245) reported an unusually large leiomyoma of the esophagus, thus adding another to the 46 cases known to have been reported in the world literature. The tumor measured 10 by 5 by 5 cm.

Schütz (A 1877) observed a case of dysontogenetic cyst of the esophagus, located in the lower segment. It was possible to extirpate the cyst from the muscularis without opening the mucosa. Such cysts are among the rarest esophageal tumors; only 9 cases have been reported.

and the α -naphthol test was applied after 1-3 days' incubation Methylglyoxal was found to inhibit the growth of these organisms in low concentration, but within the range of growth (1 1000-1 3000) no positive results were obtained In the 1 500 dilution a reddish-brown colour developed after about one hour but the nature of this was uncertain, as higher concentrations gave only a yellow

From this experiment no evidence was obtained that methylglyoxal is a precursor of acetylmethylcarbinol

Lactic acid

Lemoigne (1913) showed that acetylmethylcarbinol could be formed by *Acetobacter aceti* from lactic acid ($\text{CH}_3 \text{ CHO} \text{H} \text{ COOH}$) No 2 3-butylene glycol was found but he suggested that it may have been produced and completely oxidised to acetylmethylcarbinol, or that in this particular fermentation the carbinol was derived from pyruvic acid, though this substance also was not detected The same worker (1923) found that acetylmethylcarbinol and small quantities of 2 3-butylene glycol were formed by *B subtilis* in a 2 per cent calcium lactate medium after about 2 weeks' incubation and held that a long period of incubation was required on account of the stability of the lactate Hermann and Neuschul also obtained acetylmethylcarbinol from a 2.5 per cent sodium lactate medium with 12 out of 13 strains of *A. aceti* after one month's incubation and suggested that the lactate was first oxidised to pyruvate, but Whetham obtained none from lactate with *B. aerogenes* and suggested, as for pyruvate, that when it was produced it originated in sugar synthesised from these substances Nagai (1923) showed that small amounts of acetaldehyde could be formed from lactate by *B. lactis aerogenes*, and Quastel, Stephenson and Whetham (1925) found that *B. coli communis* was able to produce pyruvic acid readily from lactic acid anaerobically, but under aerobic conditions the presence of an oxygen donator such as sodium nitrate was essential I have found no reference to the production of acetylmethylcarbinol from lactic acid by members of the *coli-aerogenes* group, and my experiments with this substance have given somewhat indefinite results Cultures of both *B. coli* and *B. aerogenes* gave weak or doubtful reactions in the α -naphthol test when grown for 7-12 days in a 2 per cent sodium lactate phosphate broth, and for some reason which is not clear the stronger of these were given by *B. coli* If, however, 1 per cent potassium nitrate were incorporated in the medium a distinctly positive reaction was obtained with *B. aerogenes* after 1-2 days' incubation, but it became weaker thereafter, cultures of *B. coli* were negative until about the 7th day and then were weakly positive With

roentgen treatment altogether. He expressed the opinion that endobronchial excision or bronchotomy is justified only for small tumors and on healthy parenchyma. He too advocated resection, because it is radical and not likely to produce relapses.

Löhr and Soder (D 10) stated the reasons for their opinion that one should not speak of pneumonia following *blunt thorax trauma* but should call it the "contusion syndrome." The treatment of that syndrome, then, is prophylactic with regard to pneumonia.

Permanent damage is observed in thoracic deformities and also in severe thickening of the pleura. The authors' opinion is that (not counting contusions) rupture of the small or smallest bronchi next to a pulmonary fissure is most likely to cause tangible changes.

Krauss-Freiburg (D 524) reported on *divulsion of a main bronchus* in a seventeen-year-old boy and its treatment. Suturing of the bronchus to the trachea was done ninety-eight days after the accident. After an eventless postoperative period, good ventilation of the pulmonary field and the flow of blood through the pulmonary vessels was proved. Nevertheless, there was no evidence of oxygen absorption by that lung. The authors, therefore, arrived at the conclusion that surgical intervention must be undertaken as early as possible, i.e., before the alveolar epithelium loses its function.

Hasche (U 343) insisted upon the necessity of active surgical intervention in the presence of *any massive bleeding from the lungs*, stating that death ensues not from the hemorrhage but from suffocation. The development has justified his hypothesis.

Tuberculosis of the lungs nowadays offers the widest scope for surgical intervention, the application of which as a complementary measure has increased accordingly. Massen and Oligschläger (U 304) advocated resection of tuberculoma, on the basis of their experiences with patients treated by conservative methods. Only one-third of 127 patients with tuberculoma could be stabilized. Two-thirds remained clinically active; in 45 per cent, cavities formed.

Resection has increasingly replaced all irreversible collapse therapy. Reitter (D 273)

demand a more fundamental indication for collapse therapy, for the following reasons: in the collapsed lung there occur basic morphologic changes and pathologic processes in the bronchial tree, the blood vessels and the lymph ducts, and also in the pulmonary parenchyma and pleura.

Not only the diseased tissue but the healthy pulmonary parenchyma is functionally destroyed. If resection becomes necessary, therefore, it must be extended to cover far larger segments. In addition, the consequent mortality rate is higher (see also Zenker).

Schmidt (U 296) went even farther: for the aforementioned reasons, he considers resection the method of choice for tuberculosis of the lungs, admitting the uses of collapse therapy only when resection is impracticable.

For tuberculoma, Klinner (D 537) advocated the lobe or segment resection, rejecting excision and enucleation. Under "tuberculoma" he included all caseous foci delineated by specific granulation tissue. In 36 out of 40 cases he obtained a cure.

On the basis of their own experiences, Zenker, Heberer and Scholze (U 194) confined the indications to *fibrous-caseous apical foci* and tuberculoma without involvement of the lobar bronchus. They recognized a relative indication in cases of isolated cavities without disseminated foci and of localization of *rest* or relapse cavities not adaptable to collapse therapy.

They perform segmental resection also for rest cavities after a thoracoplastic procedure, after local treatment of bilateral processes and after pyothorax with circumscribed foci. The last-mentioned indication for segmental resection has not been accepted by other authors. Many of them, including the abstractor of this paper, are in favor of lobectomy.

The fact that the patient is a child is not, according to Müller (V 721), an absolute contraindication to resection, though he prefers collapse therapy for tuberculous children, especially if there are solid round foci, and reserves resection for unmanageable cavities, severe primary phthisis, and extended bronchiectasia. (Contrary to this opinion, the abstractor insists that the indications for a child do not differ from those for an adult.

showed that under anaerobic conditions this organism produced twice as much 2 3-butylene glycol from glucose as from mannitol. He obtained equal amounts of acetylmethylcarbinol from both sugars but only traces of this substance were found. These and other experiments (Walpole) seem to show that oxygen is necessary for the accumulation of acetylmethylcarbinol in cultures and it is possible that the carbinol is derived from 2 3-butylene glycol.

The formation of acetylmethylcarbinol from lactic acid is effected slowly, apparently by *B. coli* as well as by *B. aerogenes*, but more readily by the latter if nitrate is present as an oxygen donor, which suggests that lactic acid is first oxidised to pyruvic acid, but it is unlikely that this mechanism has any important place in the formation of the carbinol from glucose.

If the doubtful or weakly positive α -naphthol reactions given by cultures of *B. coli* containing high concentrations of glucose and pyruvate are due, as seems probable, to traces of acetylmethylcarbinol, which substance this organism can form readily from 2 3-butylene glycol, then the capacity of members of the *coli-aerogenes* group to form the carbinol is only a matter of degree, being most highly developed in *B. aerogenes* and *B. cloacæ*, less in the intermediates and least in *B. coli*.

According to Harden (1905-06) the V-P reaction is due to oxidation of acetylmethylcarbinol to diacetyl ($\text{CH}_3 \text{ CO CO CH}_3$), which in turn combines with some constituent of the broth culture to give a red colour. It has recently been suggested, however, by Horowitz-Wlassowa and Rodionowa (1932-33) that the reaction is due to the combination of quinone with the amido groups of the peptone, the quinone being formed by the action of strong alkali on diacetyl. Harden showed that *p*-xyloquinone ($\text{C}_6\text{H}_2\text{O}_2(\text{CH}_3)_2$), which is produced from diacetyl by caustic alkali, did not give a positive V-P reaction, and my experiments with this substance have given negative results.

Summary

1 The α -naphthol test has been used to investigate the origin of acetylmethylcarbinol in bacterial fermentation.

2 It has been shown that *B. aerogenes* can form acetylmethylcarbinol from pyruvate and under certain conditions from lactate, but not from methylglyoxal or preformed acetaldehyde.

3 Many organisms can readily oxidise 2 3-butylene glycol to acetylmethylcarbinol, and it is suggested that in the bacterial fermentation of glucose this substance may precede the formation of acetylmethylcarbinol.

4 It is suggested that all members of the *coli-aerogenes* group produce some acetylmethylcarbinol from glucose, the differences between them being quantitative rather than qualitative.

Zenker (D 509) performed 17 resections for bilateral processes after irreversible collapse measures. One patient died; postoperative complications occurred in 3 cases. Zenker emphasized the fact that this relatively unfavorable result was conditioned by the preceding collapse therapy. For this reason he insisted on more careful and detailed reflection with regard to resection before surgical collapse therapy is undertaken.

Brunner (U 177) reported on his surgical treatment of *bronchiectases* (111 resections with 3 deaths). He observed no bronchial insufficiency, but there were several cases of alveolar insufficiency after segmental resection. Reexamination showed that it is not the hyperextension of healthy lung parts, but the remaining presence of diseased parts, that causes postoperative ectasia. Postoperative sputum containing pus is, according to him, a hint that bronchiectasia is still present and calls for further resection. According to Brunner, adolescence is the most favorable time for resection. For bilateral disease he first resects the more severely diseased side.

Strahlberger and Wenzel (U 160) reported the results obtained in 34 patients operated on for bronchiectasia. The operations were done four to eight years ago. The result was determined by the possibility of complete recovery from the initial disease.

Patients with diffuse bronchiectasia permitting only incomplete resection showed only transitory improvement. The functional late result was dependent upon the loss of parenchyma. After lobectomy there was no fundamental change in ventilation capacity. On the other hand, after more extensive resection there were signs of functional hyperextension of the rest parenchyma.

In patients below the age of 50 the condition of the remaining parenchyma was satisfactory. In older patients there was an increased tendency to emphysema.

Reitter (D 520) reported on the surgical problem of the so-called "chronic pneumonia." He applied that expression to the terminal stage of unresolved pneumonia, calling the changes that accompany other pulmonary diseases "secondary pneumonia" and noting, as causes, stenosis and ectasia of the bronchial

tree, pulmonary cirrhosis or fibrosis following roentgen treatment, the inhalation of certain gases and changes occurring after severe trauma. To these he added genuine pulmonary gangrene. He operated on 60 of 74 patients, with a mortality rate of 13 per cent. The cause of death in almost every case was failure of circulation.

Difficulties present themselves in diagnosis as well as in technic and postoperative treatment. The last-mentioned is made difficult by the fact that patients with chronic pneumonia have usually been treated with antibiotics for a long time, which has made the organisms resistant.

Geissendorfer (D 496) reported his experience in the treatment of 500 patients suffering with carcinoma of the lung. The anamnesis ranged between five and ten months. Of a total of 37.8 per cent of operable tumors, only 8 per cent could be treated by palliative operations. Among 48 carcinomas of the middle lobe, only 2 were operable. The rate of early mortality after pneumectomy was 22.6 per cent. Eleven per cent of the resections resulted in cure for five years. (The decisive point is to reach the two-year line.) Operative results with undifferentiated carcinoma were discouraging. Postoperative roentgen treatment in the cases observed failed to confirm the choice of treatment in 63 per cent.

Salzer (D 501) reported on 911 bronchial carcinomas. In 375 cases only an exploratory thoracotomy could be performed. Salzer rejects palliative operations. Twenty-three per cent of the reexamined patients remained cured for four years. The prognosis was surprisingly poor in cases of peripheral carcinoma among his patients.

Becker and Knote (U 67) reported on the fate of inoperable bronchial carcinomas, which depends fundamentally upon the type of the tumor. Of a total of 84 patients who underwent thoracotomy, 23 died. The average survival time was six months. Thoracotomy did not produce accelerated growth of the tumor. The average survival for clinically inoperable patients was about six months. Eleven patients refused operation. They lived another six and a half months. Of 147

- NEUBERG, C, AND ROSENTHAL, O 1924 *Ber dtsh chem Ges*, lvi 1436
- O'MEARA, R A Q 1931 *this Journal*, xxvii 401
- PAINE, F S 1927 *J Bact*, xiii 269
- PETERSON, W H, AND FRED, E B 1920 *J Biol Chem*, xlii 29
- QUASTEL, J H, STEPHENSON, M, AND WHETHAM, M D 1925 *Biochem J*, xix 304
- THOMPSON, J 1911-12 *Proc Roy Soc*, B, lxxvii 500
- VIRTANEN, A I 1923 *Societas Scientiarum Fennica Commentationes Physico Mathematicæ*, Helsingfors, i no 36
- WALPOLE, G S 1910 11 *Proc Roy Soc*, B, lxxviii 272
- WERKMAN, C H 1930 *J Bact*, xx 121
- WHETHAM, M D 1927 *Austral J Exp Biol Med Sci*, ix 35

pregnant women, in order to shield the newborn from tetanus infection of the umbilical cord. In the treatment of severe tetanus infections the supercooling method has proved successful. Muscle relaxants, especially MV 301, seem to act better than curare (Beyer, G 298; Bronisch, E 333; Kohlfahl, C 343; Möllerfeld, A 1636, and Tzamalukas, A 293).

Among the different narcotics, phenothiazines and muscle relaxants have gained in importance, particularly for the alignment of fractures. Killian (A 1156) advocated locastin, which does not affect the circulation (Wagner, A 970). At present, opinion as to the different narcotics is widely divergent, and no definite verdict is possible as yet (Lorenz and Kloes, E 1).

Primary damage to the brain, accompanied by *commotio cerebri*, if caused by injuries, can hardly be influenced. There should be no bed rest routine. The fasting blood sugar value should be determined. High doses of pyramidon are contraindicated, because they cause irritation of the vegetative nervous system. No lumbar puncture should be used. For severe headache, blocking of the stellate ganglion should occasionally be done. Severe cerebral trauma accompanied by shock calls for blood transfusions and oxygen and megaphen treatment. Small doses of pendiomide reduce edema of the brain.

Acute subdural hematoma caused by tearing of the pontal veins is usually associated with severe trauma of the brain stem. Increasing unconsciousness calls for a trial trephining. This method, however, must not be used in cases of extension spasm, pulmonary edema or falling off of the blood pressure. Tracheotomy and suction and drainage of the mucous secretions are indicated in cases of obstruction of the respiratory tract.

In cases of *open brain trauma*, the particles of brain debris must be removed from the brain cavity without damaging the adjacent tissue. For this purpose, manual compression of both jugular veins (Queckenstedt test) is recommended. Suction drainage of the brain cavity may be omitted, provided there is no foreign body in the brain tissue.

In the treatment of *epilepsy* following cerebral trauma, excision of scars as far as the

ventricles is not sufficient, because the spasm-causing parts of the brain are located in the adjacent ganglion cells. Corticographic study of the open brain cortex will determine the location of the spasm segments. Then the segments of damaged brain may be removed. Reexamination by electroencephalogram is mandatory in all cases of severe brain trauma (Jansen, E 224; Lembecke, A 599; Merram, A 1690; Ohnesorge, C 380; Stender, A 443, and Weber, A 681).

Blunt injuries of the cardiac area.—*Comotio cordis* has no anatomically tangible effects, yet it may aggravate existing damage in the vessels. All pathologically pertinent changes are summarized under the heading, *contusio cordis*. They lead mostly to severe pericardial, epicardial or myocardial damage, which calls for treatment by an internist. Only rupture of the pericardium now and then requires surgical intervention. Cardiac trauma in connection with the surface of the body must be operated on as quickly as possible, provided the condition of the patient still permits it. Suture of a piece of skin may be tried when a coronary artery is injured. It is astonishing to see how injury by impalement of the heart, when operated on, heals completely without secondary damage (Derra, D 313 and A 711; Grosse-Brockhoff, D 300; Krönke, C 81; Kuntz, C 472; Meesen, D 288; Niedner, F 177, and Spiegelhoff and Watrin, E 193).

In cases of *trauma of the chest*, rupture of a bronchus is often overlooked because the patient is in severe shock. Pulmonary emphysema ensues, as do atelectasis and pneumothorax. Bronchoscopic and bronchographic study may provide information as to the type of injury. Krauss (A 714 and D 524) succeeded in suturing a ruptured bronchus ninety-eight days after the injury.

Greater injuries of the liver.—The mortality rate of such injuries, without timely surgical intervention, runs up to 100 per cent. Tamponade with a gelatin sponge overlaid with a gauze tampon is necessary to prevent a fatal hemorrhage after removal of the gauze tampon. After the operation, therapy is necessary for protection of the liver (Scholz, A 1633).

The study of blood groups in man and animals has shown that antigenic differences are determined by dominant genes and the suggestion has been put forward that the genes determining susceptibility to tumour transplantation might be identical with those determining antigenic differences. A study by Haddow (1934) along these lines using a fowl sarcoma gave a negative result. Since pure lines of fowls cannot be obtained, it was thought worth while to perform a similar experiment with pure lines of mice.

Materials and methods

Mice used Two pure lines of mice were used, viz. a line of blacks and a line of albinos. Both strains have been described previously (Gorer, 1936). The albinos have been shown to possess an antigen (described as antigen II) in their erythrocytes, detectable with sera from immunised rabbits, which is lacking in those of the blacks, its presence is determined by a single dominant gene (Gorer, 1936, 1937).

The following crosses were made

	Black	by	albino	=	F ₁	generation
F ₁		"	"	=	A	backcross
F ₁		"	black	=	B	backcross
F ₁		"	F ₁	=	F ₂	generation

The last two crosses are the most important for the genetic analysis.

The tumour arose in an albino female about 12 months old, and macroscopically it appeared to be a typical mammary carcinoma. Unfortunately no sections were cut. For the first transfer it was successfully inoculated by trocar and cannula into 12 albinos and failed to grow in 12 blacks. For the second transfer the tumour was minced and ground with sterile sand, saline being added in the proportion of 10 c.c. of saline to 1 g. of tissue and the emulsion strained through one layer of muslin. Six albino males received 0.5 c.c. of the emulsion in each flank and intraperitoneally. After a latent period of about 5 weeks rapidly growing tumours developed. One of these when removed for further transplantation was found to be much harder than the original growth. Histological examination of the subcutaneous masses gave the appearance of a highly malignant carcinoma with sarcomatous change in the stroma (figs. 1 and 2), many of the mesenteric deposits gave the appearance of a pure spindle cell sarcoma, whilst in others epithelial elements were also present. Since then, the tumour (now in its seventeenth transfer) appears to be a pure spindle cell sarcoma and has shown remarkably constant behaviour in successive transfers. Growth is somewhat more rapid when trocar and cannula are used instead of the saline emulsion and the former technique has been employed for genetic analysis.

When transplanted into blacks or albinos, tumours are palpable in the great majority of cases at the end of a week. In the blacks regression occurs somewhat suddenly between the tenth and seventeenth days, the tumours may have attained a diameter of $\frac{1}{2}$ cm. or more prior to regression. In susceptible animals the tumour grows progressively and may ulcerate or become firmly attached to the underlying muscles. After from four to six weeks the animals become markedly cachectic and die, death is much quicker after intraperitoneal inoculation.

Myelograms	595	Phlebeetasia	690
Necrosis		multiple, of small intestine	690
avascular	491	Phlebitis	18
Neurologic surgery		of leg	18
January	46	Pregnancy	
February	160	complicating splenic carcinoma	183
April	457	simultaneous uterine and abdominal	194
May	576	Prosthesis	
Nose		articulated acrylic	359
cutaneous carcinoma of	511	Placenta praevia	466
flat, plastic repair of	359	Plastic and Reconstructive Surgery	
Obstetric and Gynecologic Surgery		March	273
February	170	April	511
April	466	May	646
May	466	June	752
June	700	Proctologic Surgery	
Operations		February	218
anorectal, with hyaluronidase	755	May	649
for esophageal stenosis	656	June	755
for hypospadias	568	Ptosis	
intraocular	613	of kidney	36
for maxillofacial injuries in children	640	Reconstruction	
Ophthalmologic Surgery		total, of ear	290
April	471	of labia	365
May	613	Respiratory Tract	
June	723	effects of smoking on	210
Orthopedic Surgery		Retrusion	
January	61	maxillary	384
February	197	Seccion en Español	
April	471	January	110
May	620	February	248
June	738	Section, cesarean	
Os calcis		extraperitoneal	176
solitary cyst of	83	Shunt	
Otorhinolaryngologic Surgery		portacaval, for Eck's fistula	528
February	210	Stapes	
April	497	mobilization of	627
May	497, 627	Sterility	
June	742	postvasectomy	453
Otosclerosis		Syndrome	
hearing defects due to	497, 620, 742	Foster-Kennedy	239
Palate		postconcussion	46
cleft	384	Technic	
Palsy		modern, of knife conization	700
cerebral, of lower extremities	457	of ocular tendon transplant	731
Paralysis		Thigh	
of interosseous muscle	738	lift	330
Parathyroids		Thoracic Surgery	
diseases of	520	January	92
Parotid		May	656
diseases of	503	June	761
Pelvis		Thromboangiitis obliterans	
"long," obstetric importance of	607	treatment of	110
Penis		Thrombophlebitis	
plastic construction of	352	i	

The B backcross generation affords a more sensitive test of the above hypothesis, since only one half should possess antigen II and one half of these (*i.e.* one quarter of the whole) should grow the tumour. Of eighty-four animals tested for antigen II 37 were positive and 47 negative (the deviation from expectation is not significant) and 78 were available for inoculation. The results are shown in table III. It will be seen that the observed values agree with those expected (figures in parentheses). Actually in the experiment with this cross 56 per cent lacked antigen II so the experiment was slightly biased in favour of disclosing any susceptible animals that lacked the antigen.

TABLE III

Results of inoculation of B backcross (progeny of F_1 hybrid by black)

Antigenic type of mouse	Result of inoculation.		
	+	-	Total
With antigen II	17 (19.5)	17 (19.5)	34 (39)
Without antigen II	0	44 (39)	44 (39)
	17 (19.5)	61 (58.5)	78

Figures in brackets as in table II

It should be pointed out that not all the tumours in these two crosses ran a typical clinical course. In two B backcross animals the tumour did not regress but remained more or less stationary, in one case the animal is still alive three months after inoculation, the other was killed and the tumour found to be a thin-walled cystic growth, histologically the cells are markedly pleomorphic (compare figs 3 and 4 with figs 5 and 6). In both cases the tumours were freely movable and did not become fixed as in typical cases. In one B backcross and one F_2 animal the inoculation appears to have been made rather deeply, the tumours invaded the diaphragm and spread extensively in the thoracic cavity, causing death within 14 days. Had this not occurred the tumours might have regressed. Five F_2 animals had extremely slow-growing tumours very similar to those described above. All these nine animals possessed antigen II and have been classified as positive.

As has been mentioned earlier, the tumour will grow for about a week in almost any mouse. In the hybrid generations, in all cases except one, it was possible to detect negative individuals within three weeks, regression taking place rather more slowly in those cases where antigen II was present. In one such (an F_2 animal) regression was not complete for over four weeks.



*Literature, reprints
and measuring charts
on request*

DOCTOR, are you sure . . .

Many times you have undoubtedly prescribed THE JEWETT BRACE. If your patient has received The Jewett Brace, it is equipped with a hinged pad on the sternum; a fixed pad on the pubis, stainless steel bands to hold the lumbar support; with worm screw adjustment; provision for locking the brace on the patient; plastic, impervious to water with no absorption to the skin, covering the sponge rubber pads; the fine workmanship and custom qualities produced by the best brace-making technique from the patient's measurements.

These features are found in The Jewett Brace and to be sure that you have them all, insist that it be lettered in gold on the lumbar pad—"THE JEWETT BRACE."

FLORIDA BRACE CORPORATION

Box 1366, 1511 Harmon Avenue Winter Park, Florida

HAVE YOU CHANGED YOUR ADDRESS?

To insure uninterrupted delivery of your *Journal* please return this coupon or send the same information on a post card to *Journal of the International College of Surgeons, Circulation Office*, 10 Columbus Circle, New York 19, N. Y.

Name _____ Please print

Former Address: _____ New Address: _____

Street _____ Street _____

City _____ City _____

Zone _____ State _____ Zone _____ State _____

For countries outside the United States:

_____ Name of Country

SUBSCRIBE

to the

*Journal, International
College of Surgeons*



For details see

"INFORMATION"

Page XIV

THE RUSSEL
MEDULLARY PIN
PATENTED

ONLY BY



*Habit
Forming!*

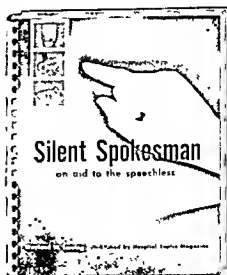
THE BERIVON

Company

MERIDIAN, MISS.

Book Becomes "Voice" for Speechless

A time-saving "communication book" for every doctor, nurse, and attendant who has to deal with the patient handicapped by aphasia (loss of speech). Patients can make wants known by pointing to pictures of objects or to words and sentences which have been carefully selected to cover most common needs. Book eliminates frustrations of patient and nurse which result from patient's inability to make himself understood.



Hospital Topics
30 W. Washington St.
Chicago 2, Illinois

Please send me _____ copies of the Silent Spokesman
at \$1.50 each.

☐ Check is enclosed ☐ Bill me

Name _____

Address _____

City _____

State _____

ICS-657

By
Wayland W. Lessing
\$1.50

If the animals with atypical growths are classified as negative the agreement with a two factor ratio is less satisfactory and one cannot exclude the hypothesis that though two genes will allow growth for a limited period, three genes are needed for a typical progressive growth. However this does not influence the chief point at issue namely that *antigen II must be present in the tissues of the host otherwise the tumour will regress*.

It is possible to obtain more direct evidence on the importance of antigenic differences by an examination of the sera of animals in which the tumour has regressed. Ten blacks were bled between 14 and 17 days after inoculation, at which time the tumours had either disappeared completely or were obviously regressing rapidly. When such sera were tested against the cells of blacks and albinos at 37 C. those of the latter were specifically agglutinated. The titre of the sera varied from about 1:5 to 1:100. Agglutination tests at room temperature gave feeble or negative results but it could be shown that the agglutinins were absorbed at this temperature. Rabbit sera containing antibody II behave in this way but it will be impossible to state definitely whether these iso agglutinating sera contain antibody II or other antibodies or both until sufficient sera are available to perform fairly extensive absorption tests with hybrids. At present it is impossible to say more than that iso agglutinins are formed when the tumour regresses.

Discussion

On *a priori* grounds it seems likely that antigenic differences between transplanted tissues and those of the host will be important in determining the fate of the transplant. Further it is apparent that the host should react only to antigens present in the donor's tissue but absent from its own, on the other hand it should not matter if the host possesses antigens that are lacking in the donor's tissues (Loeb and Wright, 1927). It is far easier to detect antigenic differences between erythrocytes than between fixed tissues and for this reason attempts have been made to study the antigenic basis of transplantation by means of hæmagglutination experiments. Since studies along these lines in fowls by Kozelka (1933) with integumental grafts, and by Haddow (1934) with a sarcoma have given negative results, it may be as well to consider some of the possible limitations of this method of investigation.

It is well known that antigenic differences exist between different organs of the body and it is possible that Kozelka's results may be explained along these lines, this appears probable in the light of Yosida's (1928) finding that the human group antigens are absent from the epithelial cells of the skin. Another point which might influence the result is that substances antigenic for a foreign species

If the animals with atypical growths are classified as negative the agreement with a two factor ratio is less satisfactory and one cannot exclude the hypothesis that though two genes will allow growth for a limited period three genes are needed for a typical progressive growth. However, this does not influence the chief point at issue namely that *antigen II must be present in the tissues of the host otherwise the tumour will regress*.

It is possible to obtain more direct evidence on the importance of antigenic differences by an examination of the sera of animals in which the tumour has regressed. Ten blacks were bled between 14 and 17 days after inoculation at which time the tumours had either disappeared completely or were obviously regressing rapidly. When such sera were tested against the cells of blacks and albinos at 37 C. those of the latter were specifically agglutinated. The titre of the sera varied from about 1:5 to 1:100. Agglutination tests at room temperature gave feeble or negative results but it could be shown that the agglutinins were absorbed at this temperature. Rabbit sera containing antibody II behave in this way but it will be impossible to state definitely whether these iso agglutinating sera contain antibody II or other antibodies or both until sufficient sera are available to perform fairly extensive absorption tests with hybrids. At present it is impossible to say more than that iso agglutinins are formed when the tumour regresses.

Discussion

On *a priori* grounds it seems likely that antigenic differences between transplanted tissues and those of the host will be important in determining the fate of the transplant. Further it is apparent that the host should react only to antigens present in the donor's tissue but absent from its own, on the other hand it should not matter if the host possesses antigens that are lacking in the donor's tissues (Loeb and Wright 1927). It is far easier to detect antigenic differences between erythrocytes than between fixed tissues and for this reason attempts have been made to study the antigenic basis of transplantation by means of hæmagglutination experiments. Since studies along these lines in fowls by Kozelka (1933) with integumental grafts, and by Haddow (1934) with a sarcoma have given negative results, it may be as well to consider some of the possible limitations of this method of investigation.

It is well known that antigenic differences exist between different organs of the body and it is possible that Kozelka's results may be explained along these lines, this appears probable in the light of Yosida's (1928) finding that the human group antigens are absent from the epithelial cells of the skin. Another point which might influence the result is that substances antigenic for a foreign species

The nature of the immunity reactions that follow transplantation of a tumour has been subject to dispute (Woglom, 1929). It is important to decide whether the reactions are directed against malignant tissues *per se* or are elicited by antigenic differences between the tissues of the host and those of the animal in which the tumour arose. Experiments with genetically purified stocks give evidence in favour of the latter hypothesis.

Summary

1 A sarcoma arising in a pure line of albino mice was found to be transferable to all other members of the line and certain hybrids derived from it but not to unrelated mice.

2 Genetic investigation showed that two (possibly three) dominant genes must be present in the host or the tumour will regress. One of these genes appears to be identical with that determining the presence of an antigen (antigen II) detectable in the erythrocytes of normal albino mice.

3 Iso agglutinins have been demonstrated in the sera of mice in which the tumour has recently regressed.

4 The above conclusion is considered in the light of results obtained in similar studies by other workers and the importance of using pure lines is stressed.

I am deeply indebted to Dr H. Schutze for his help in the preparation of this paper and to Sir John Ledingham and Professor J. B. S. Haldane for their advice and encouragement.

REFERENCES

- | | | |
|----------------------------------|---------|---|
| BITTNER, J. J. | 1935 | <i>J. Genet.</i> , xxxi , 471 |
| CLOUDMAN, A. M. | 1932 | <i>Amer. J. Cancer</i> , xvi , 568 |
| GORER, P. A. | 1936 | <i>Brit. J. Exp. Path.</i> , xvii , 42 |
| " | 1937 | <i>Ibid.</i> , xviii , 31 |
| HADDOW, A. | 1934 | <i>this Journal</i> , xxxix , 345 |
| KOZELKA, A. W. | 1933 | <i>Physiol. Zool.</i> , vi , 159 |
| LITTLE, C. C., AND TYZZER, E. E. | 1915-16 | <i>J. Med. Res.</i> , xxxiii , 393 |
| LOEB, L. | 1909 | <i>Z. Krebsforsch.</i> , vii , 80 |
| LOEB, L., AND WRIGHT, S. | 1927 | <i>Amer. J. Path.</i> , iii , 251 |
| STRONG, L. C. | 1929 | <i>J. Cancer Res.</i> , xiii , 103 |
| TYZZER, E. E. | 1909 | <i>J. Med. Res.</i> , xxi , 519 |
| WOGLOM, W. H. | 1929 | <i>Cancer Rev.</i> , iv , 129 |
| YOSIDA, K. I. | 1928 | <i>Z. ges. exp. Med.</i> , lxiii , 331 |

need not be effective antigens in the homologous species, this would appear specially likely to happen when the two species are widely separated zoologically. The human agglutinogens M and N are antigenic for the rabbit but apparently not for man. It will be seen that the results obtained by Kozelka and Haddow, both working with fowls and using immune rabbit sera and normal ox sera respectively, might be explained along these lines. In connection with Haddow's results it should be mentioned that several workers have shown that normal sera give different results at room temperature and at body temperature, differences detectable only at the lower temperatures might not be important for transplantation.

Apart from the questions dealt with above, genetic work has given reasons for believing that further points must be dealt with in regard to tumours. As may be seen from Bittner's review, tumours arising from the same pure line may need widely different numbers of genes for transplantation. As a rule the more malignant a tumour the smaller the number of genes needed and in some cases this genetic simplification has been observed to occur suddenly in the course of transplantation. It appears that this elimination of factors, which is possibly antigenically analogous to the smooth-rough transformation of bacteria, occurs in a rather haphazard fashion. Cloudman (1932) made a genetic study of eight mammary tumours arising in the albino strain used in this work. He found that even if two tumours arose in the same individual and required the same number of genes, the genes need not be identical except that one gene was common to all tumours studied, thus it might happen that one tumour needed the presence of factors A and B whilst another needed factors A and C.

It will be seen that the failure of other workers to throw any light on the antigenic basis of transplantation by means of hæmagglutination experiments may be due to chance, if the serum contains only one or two antibodies specific for the tissues of a given pure line, these need not be present in all tumours derived from that line. It should be emphasised that the chances of failure are greatly increased if hybrid stocks are used. Studies by Strong (1929) and by Bittner (1935) have shown that tumours arising in F_1 hybrids require the presence of factors derived from both parent strains. If we assume that all the factors are antigens, it will be seen that a tumour may apparently possess any of the antigens present in the tissues of the animal in which it arises. Thus a tumour arising in one pure line might have any of the antigens from A to M (assuming that 13 factors are present in the normal tissue), that arising in the other line might have any factor from M to Z, whilst that arising in the hybrid might possess any from A to Z.

The nature of the immunity reactions that follow transplantation of a tumour has been subject to dispute (Woglom, 1929). It is important to decide whether the reactions are directed against malignant tissues *per se* or are elicited by antigenic differences between the tissues of the host and those of the animal in which the tumour arose. Experiments with genetically purified stocks give evidence in favour of the latter hypothesis.

Summary

1 A sarcoma arising in a pure line of albino mice was found to be transferable to all other members of the line and certain hybrids derived from it but not to unrelated mice.

2 Genetic investigation showed that two (possibly three) dominant genes must be present in the host or the tumour will regress. One of these genes appears to be identical with that determining the presence of an antigen (antigen II) detectable in the erythrocytes of normal albino mice.

3 Iso agglutinins have been demonstrated in the sera of mice in which the tumour has recently regressed.

4 The above conclusion is considered in the light of results obtained in similar studies by other workers and the importance of using pure lines is stressed.

I am deeply indebted to Dr H. Schutze for his help in the preparation of this paper and to Sir John Ledingham and Professor J. B. S. Haldane for their advice and encouragement.

REFERENCES

- | | | |
|----------------------------------|------|---|
| BITTNER, J. J. | 1935 | <i>J. Genet.</i> , xxxi , 471 |
| CLOUDMAN, A. M. | 1932 | <i>Amer. J. Cancer</i> , xvi , 568 |
| GORER, P. A. | 1936 | <i>Brit. J. Exp. Path.</i> , xvii , 42 |
| | 1937 | <i>Ibid.</i> , xviii , 31 |
| HADDOW, A. | 1934 | <i>this Journal</i> , xxxix , 345 |
| KOZELKA, A. W. | 1933 | <i>Physiol. Zool.</i> , vi , 159 |
| LITTLE, C. C., AND TYZZER, E. E. | 1915 | 16 <i>J. Med. Res.</i> , xxxiii , 393 |
| LOEB, L. | 1909 | <i>Z. Krebsforsch.</i> , vii , 80 |
| LOEB, L., AND WRIGHT, S. | 1927 | <i>Amer. J. Path.</i> , iii , 251 |
| STRONG, L. C. | 1929 | <i>J. Cancer Res.</i> , xiii , 103 |
| TYZZER, E. E. | 1909 | <i>J. Med. Res.</i> , xxi , 519 |
| WOGLOM, W. H. | 1929 | <i>Cancer Rev.</i> , iv , 129 |
| YOSIDA, K. I. | 1928 | <i>Z. ges. exp. Med.</i> , lxiii , 331 |

SHORT ARTICLES

576 809 73 577 176 21

ACQUIRED RESISTANCE TO OSTRONE IN A MALE MOUSE

HAROLD BURROWS

The Peacock Institute The Peacock Cancer Hospital (Free) London

(PLATES LXXX AND LXXXI)

Numerous experiments have been performed to determine the action of oestrogens on male mice. Occasionally in the course of these experiments a mouse after prolonged dosage has failed to react in the usual way. Hypothetically the cause of such an acquired resistance might be an increased output of testosterone or other androgen. Most of the pathological changes produced in the male accessory genital organs by an excess of oestrogen can be prevented, or if already present can be caused to disappear, either by reducing the supply of oestrogen or by increasing the supply of androgen. In the case about to be described the mouse seems to have become resistant to oestrone through an extensive development of new androgen producing tissue.

The mouse, not of an inbred strain was one of a batch which had been treated by applying oestrone dissolved in benzene twice a week to the skin of the back. For the first 50 days of the experiment the concentration of oestrone used was 0.01 per cent. after this till the mouse's death on the 455th day, a concentration of 0.1 per cent. was used, the last application being made on the morning of this day. The mouse was killed with coal gas and the first unusual features observed were a coagulation plug projecting from the urethra and an enlarged right testicle. (When a healthy mouse is killed with coal gas, seminal fluid is ejaculated and coagulates. Ejaculation is not noticed as a rule with mice which have been under prolonged treatment with oestrogens, in these mice sexual secretions are usually deficient or absent.) The dimensions of the right testis were $10/6 \times 6$ mm. and of the left, $7.5/5/5$ mm. Although the latter measurements are approximately those of a normal adult, they are greater than would be expected after long treatment with oestrone. Both testes were yellowish and were more rounded than normal. To the naked eye the coagulating gland, seminal vesicle, prostate, and bulbo urethral and preputial glands all appeared normal and contained secretion; the crura penis and bulbar muscles were not atrophic. On the other hand there was a gap of 2.5 mm. between the pubic bones, the symphysis being represented merely by a thin band of fibrous tissue.

Microscopical examination shows normal epithelium in the urethra and in all the accessory genital organs except the coagulating gland. Part of the duct of the latter and some of the glandular tissue adjacent to it are lined by squamous stratified epithelium (figs 1 and 2). The urethral end of the duct and the main body of the gland have normal epithelium and the gland is functionally active. Both adrenals show those characteristic juxta medullary collections of lipoid which have been described elsewhere by the writer (Burrows, 1936b) as resulting from the action of oestrogens (fig. 3).

The right testis consists for the most part of large interstitial cells containing unstained substance resembling lipid. No seminal epithelium is present except in a restricted group of tubules lying close to the tunica, in most of these the epithelium consists only of a single layer of cells, although one solitary tubule next the tunica has a well developed seminal epithelium with spermatids. In a large part of the testis no tubules are visible, in the regions where they can be seen the majority are devoid of epithelium and their lumina contain a material which is coloured pink with eosin and contains numerous fine unstained droplets (figs 4 and 5). The vas deferens and epididymis are distended with similar material (fig 6). The epithelium of the epididymis is flattened and shows but little sign of secretory activity.

The left testis offers a contrast with the right, for its seminal epithelium has not been extensively destroyed and there is a copious formation of spermatids, though no complete spermatozoa are seen. The interstitial cells are perhaps somewhat increased in number, and like those of the right are distended with some lipid substance. These distended cells in several places have coalesced to form large yellowish amorphous collections between the tubules (fig 7). These collections resemble those seen in the juxta medullary zone of the adrenals and appear to be formed in the same manner, namely the coalescence of neighbouring lipid-laden cells. The left epididymis, unlike the right, is not distended and its epithelium is in an actively secretory condition.

Discussion

There seems little doubt that this mouse had reacted to oestrone in the ordinary manner in the earlier stages of the experiment, and that later, under some newly developed influence, most of the affected organs had reverted to the normal state. The presence of stratified epithelium in part of the duct of the coagulating gland would indicate that this reversion was not yet complete. It has been mentioned elsewhere (Burrows, 1935) that those parts of the genital system which are the first to show metaplasia in response to oestrogens are, as a rule, the last to become normal again after the excessive supply of oestrogen has ceased, and the first appearance of an epithelial metaplasia in response to dosage with oestrogens is in the duct of the coagulating gland. The separation of the pubic bones almost proves the existence of an earlier pronounced reaction. Examination of a large number of male mice has failed to reveal a separation of the pubic bones in a single instance apart from the administration of oestrogens. On the other hand the separation is a regular late sequel to this treatment and, unlike the epithelial changes which take place at an earlier stage in the accessory genital organs, the separation of the pubic bones is relatively irreversible, if recovery occurs at all it takes a long time. Another feature which suggests strongly that the mouse had responded fully to oestrone in the earlier stages of the experiment is the condition of the adrenal glands. The juxta medullary collections of lipid present in that situation are recognised as late responses to oestrone: they appear after the changes in the accessory genital organs have become well established. Unlike the latter, however, the lipid collections, once formed, may persist for long periods after the supply of oestrogen has ceased.

From these considerations it seems almost certain that the resistance to oestrone had not been present at the beginning of the experiment but had developed during its progress. There are reasons for ascribing the increased resistance to the great overgrowth of the interstitial tissue in the right testicle, aided perhaps by the disappearance of tubular epithelium. The

PLATE



FIG. 2.—Congulating gland (D) and (CC St). A normal lobule of gland is also seen. 115



FIG. 3.—Adrenal with juxta medullary collections of lipoid (L)



FIG. 4.—Tubule of vas deferens.



FIG. 5.—Right testis showing lipoid-laden interstitial cells. On right is a tubule of vas deferens.

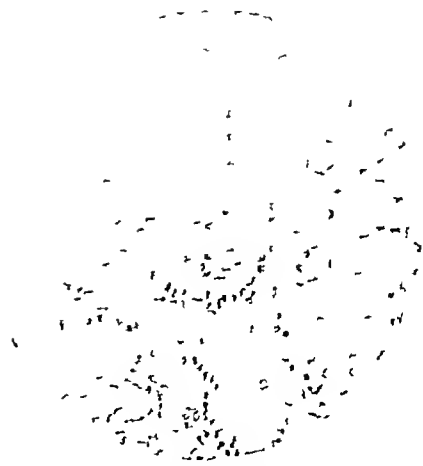


FIG. 6.—Left testis showing interstitial cells. On right is a tubule of vas deferens.

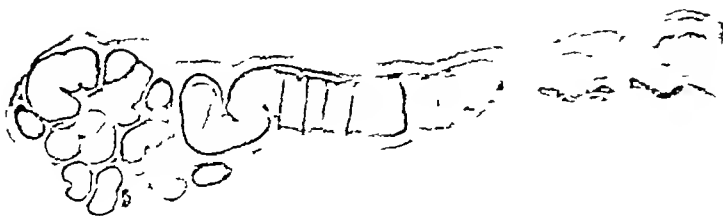


FIG. 6.—Part of right epididymis and vas deferens stained with hematoxylin-eosinophilic material.

opinion has been held by many that androgens are produced by the interstitial tissue—such an opinion seems to be supported by the case now described and by a similar case which occurred in a mouse after prolonged treatment with oestrogen. The development in male mice of minor degrees of resistance to oestrogens in the course of long continued dosage has been a common experience, and it seems possible that these minor degrees of increased resistance also may be referable to the overgrowth and activity of the interstitial cells of the testis induced by oestrogens (Burrows, 1936a), the mouse being thus enabled to produce a large amount of protective androgen. If these explanations are correct we seem to have an addition to the known defensive mechanisms of the body against pathological influences namely the increased production of a therapeutic hormone by tissue newly grown for that special purpose.


Summary

1. An experiment is described in which a male mouse subjected to the prolonged administration of oestrogen became resistant to that hormone.

2. The resistance was accompanied by great development and activity of the interstitial tissue in one testis with widespread disappearance of the tubular epithelium.

REFERENCES

BURROWS H.

 The localisation of response to oestrogenic compounds in the organs of male mice, *this Journal*, 1935, vol. 423.

"

A comparison of the changes induced by some pure oestrogenic compounds in the mammary and testes of mice, *this Journal*, 1936a, vol. 161.

'

Changes induced by oestrogens in the adrenals of male mice, *this Journal*, 1936b, vol. 121.

616 155 3—054 (567)

THE MACROPOLYCYTE IN HEALTH AND DISEASE IN IRAQ

WALTER P. KENNEDY, Capt P.A.M.C. (T) and IAN MACKAY,
Flt Lieut R.A.F., M.S.

*From the Physiology Department Royal College of Medicine Baghdad
and the P.A.F. General Hospital, Hinaidi, Iraq*

(PLATE LXXXII)

The term macropolycyte was first suggested by Sir Humphry Rolleston to describe a giant type of polymorphonuclear leucocyte which exceeds 16μ in diameter and may be over 25μ . The normal polymorph in stained films averages $10-12\mu$ in diameter occasionally reaching 14μ .

The macropolycyte has been studied in detail by Cooke (1927 a and b 1933-34), who distinguishes three types. Type I differs from the normal polymorph only in size and in the frequent hypersegmentation of the nucleus. It occurs in health, in infections and intoxications where there is a bone marrow reaction and in pernicious anaemia. Type II somewhat resembles

a megakaryocyte, having a gnarled and somewhat condensed nucleus which may have a horse shoe form or as many as 14 segments. The granules are coarse, and azurophil as well as neutrophil granules are present. Type III has fine neutrophil granules as in type I and the nuclear configuration resembles that of type II, but the nuclear structure is distinctive. It has a very open reticulum, suggesting a deficiency in basichromatin. The bulk of the nucleus is large in comparison with the cytoplasm. It may be folded on itself and is not often hypersegmented. Cooke (1934) states that types II and III are only found in pernicious anemia. He has also found a few cells intermediate between II and III.

The macropolycyte is a rare cell in the blood and its origin and significance are uncertain, but its distinctive characters lend it interest and also make it desirable to have further reports on its occurrence and morphology. According to Cooke (1927*a*) macropolycytes are encountered perhaps twice or three times a year by anyone constantly examining blood films, and they seem to be always associated with a neutrophil leucocytosis and the presence of myelocytes in the peripheral blood, at the same time, he says, they can occur in health but only very occasionally. In 1933-34 he recorded one such case, and has since privately communicated another. During some hematological studies in Iraq extending over two years, we found such an unexpected number of macropolycytes, both in healthy and diseased individuals, that it has been thought worthy of record.

Material

The normal group was composed of 400 British airmen and 200 Iraqi nationals (Kurds, Arabs, Jews, Assyrians). As has been fully explained elsewhere (Kennedy and Mackay, 1935-36) the health standard of the airmen was equivalent to that of Cooke and Ponder's (1927) original healthy series, which was selected with most stringent care to establish normal standards. The group of 200 Iraqi was not so rigidly examined, a criterion of "ordinary health" being accepted. Two macropolycytes were found in the latter group. The pathological series included malaria, leprosy, tuberculosis, phlebotomus fever, ascites, and two cases of pernicious anemia. The figures are set out in the table.

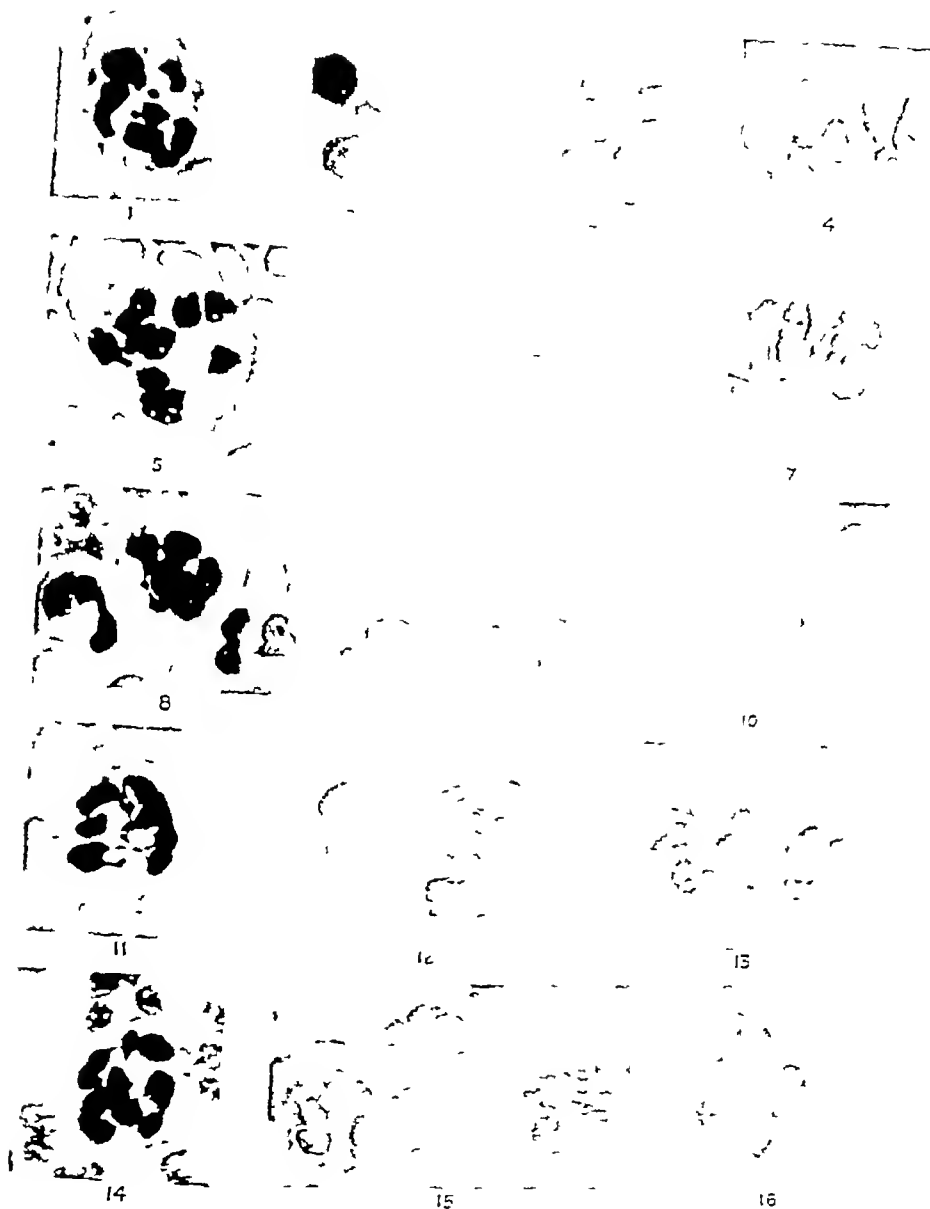
TABLE
Frequency of macropolycytes in health and disease

Group	No. of cases	Number of macropolycytes	Percentage of macropolycytes.
Normal	690	9	1.30
Malaria	304	12*	3.95
Leprosy	133	8†	6.01
Tuberculosis	120	8	6.67
Phlebotomus fever	50	1	2.00
Ascites	6	1	Not significant
Pernicious anemia	2	2	
All pathological cases excluding pernicious anemia	609	29	4.76

* Includes 1 macro-mast cell

† Includes 2 macropolycytes in one individual

The ascites in the table refers to a fatal condition found in Iraq associated with hepatic cirrhosis and occurring in the very poor. It is under investigation.



- FIGS 1-5 — Macropolyocytes from normal individuals stained Giemsa. Fig 1 a little larger than a normal polymorph but it shows hypersegmentation of the nucleus. Fig 4 includes a normal polymorph.
- FIGS 6-8 — Macropolyocytes from leprosy stained Wright. The coarse granulation common in leprosy is seen in fig 6. One normal cell is included in fig 7 and two in fig 8.
- FIG 9 — Macro mast cell from a leper stained Wright with two or three neutrophils.
- FIGS 10 and 11 — Macropolyocytes from malaria stained Leishman and Giemsa respectively. Note the hypersegmentation in fig 10 which also includes two normal polymorphs.
- FIG 12 — Macropolyocyte intermediate between types II and III from phlebotomus fever. The cell on the left is a neutrophil myelocyte. Stained Giemsa.
- FIG 13 — Macropolyocyte from a case of ascites besides a normal polymorph stained Wright.
- FIG 14 — Macropolyocyte from a case of surgical tuberculosis stained Giemsa. The red cell is shrunken.
- FIG 15 — Hypersegmented type I macropolyocyte from a case of pernicious anemia. The cell on the left is normal that on the right has six lobes. Stained Giemsa.
- FIG 16 — Type I macropolyocyte from case of pernicious anemia stained Giemsa.

Description of the cells

The polynuclear count of Cooke and Ponder, which is derived from Arneth's original classification, divides the neutrophil leucocytes in man into five classes according to the segmentation of the nucleus. It has been fully discussed in the papers mentioned in the bibliography.

Class V consists of cells with five or more lobes. In a long series of healthy persons investigated in Scotland by one of us (W. P. K.), cells with six lobed nuclei were rare and none with more than six lobes was found. One normal-sized hypersegmented cell with eight lobes occurred in the present series in a healthy man whose polynuclear count was 43.35.19.2.1, which gives a polynuclear index (or weighted mean) of 1.83. Such cells occur in pernicious anaemia, but must be exceedingly rare in health in Britain. Further, the average polynuclear index in Britain may be taken as 2.05 ± 0.020 , that of Iraq as 1.96 ± 0.021 (average of Kennedy and Mackay's figures); that is, in Iraq the count shows a significant shift to the left. Thus hypersegmentation in the present series is even more remarkable than it would be in Britain.

The cytoplasmic granules were in many cases indistinguishable from those of ordinary polymorphs. In other instances distinctly coarser granules occurred mixed with fine ones. This, however, was complicated by the fact that in malaria and leprosy a tendency to coarser granulation was observed in the polymorphs. Exact enumeration of the nuclear lobes of the macropolycytes according to the criteria of Cooke and Ponder was impossible in many cases owing to folding and overlapping. The estimated average for the normals was 7 lobes, with a range of 4 to 10, and for the pathological series an average of 5.6 with a range of 1 to 10. Similarly exact measurements of cell diameter were complicated by irregularity of shape, the estimated average was 10.8μ .

No type II cell was found. One type III cell occurred in a case of pernicious anaemia. It was unfortunately damaged and could not be reproduced. A macropolycyte intermediate between types I and III was observed in a case of phlebotomus fever (fig. 12).

A macro mast cell was found in one case of leprosy (fig. 9), and it is interesting that in this disease the percentage of basophils was significantly higher than normal. Cooke (1927*b*) records macro-eosinophils with hypersegmentation in pernicious anaemia, and we have seen one with 3 lobes and an approximate diameter of 18μ in a case of ascaris infection.

Discussion

Cooke (1933-34) suggests that macropolycytes are either occasional polymorphs which have escaped the physiological mechanism for the removal of leucocytes from the circulation and continued to develop beyond normal limits, or cells altered by exposure to an abnormal environment in the marrow during their development. The mechanism for maintaining equilibrium between the output of the marrow and the removal of white cells from the blood appears to be altered in Iraq and indeed in other warm countries. This is shown by the deviation to the left of the polynuclear count in Iraq (Kennedy, 1934-35, Kennedy and Mackay, 1935-36), Egypt (Bernard Shaw, 1936), Manchuria (Pai, 1935, 1936), India (Bannerjee, quoted by Pai, 1936) and Australia and New Guinea (Brenl and Priestly, quoted by Pai, 1936). The consensus of opinion of these workers is that the aetiological factor is climatic. The direction of the alteration, however, would seem to be against the over-development of a polymorph though it does not exclude the possibility. The deviation to the left of the poly-

nuclear count is usually taken as an indication of marrow stress, and this is supported by the significantly large number of abnormal cells found in the blood of healthy individuals in Iraq (promy elocytes, eosinophilic myelocytes, stem cells, Turck cells, Rieder cells, plasma cells, megaloblasts, normoblasts). We are inclined to the opinion that this marrow stress is the result of the climatic environment, and that the relatively large number of macropolycytes which occurs in health is due to this stress. The even greater occurrence of these cells in pathological cases is similarly explained.

Summary

Macropolycytes were found in 1.3 per cent of 690 normal individuals and in 4.76 per cent of 609 pathological individuals in Iraq. The cells are described and the observations recorded are advanced as further support of the hypothesis that environmental factors incidental to life in Iraq result in an alteration of the hemopoietic balance.

REFERENCES

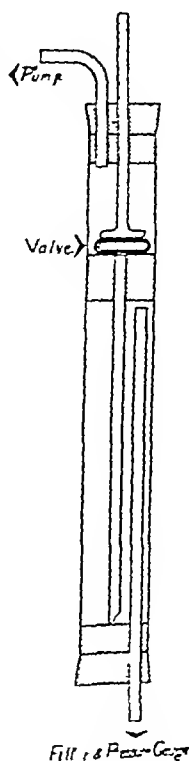
- | | | |
|--------------------------------|---------|---|
| COOKE, W. E. | 1927a | The macropolycyte, <i>Brit. Med. J.</i> , 1, 12 |
| " | 1927b | The life history of the neutrophil polymorphonuclear leucocyte, <i>J. Roy. Microsc. Soc.</i> , xlvii, 29 |
| " | 1933-34 | The macropolycyte, <i>J. Lab. Clin. Med.</i> , xix, 453 |
| COOKE, W. E., AND PONDER, E. | 1927 | The polynuclear count, <i>London</i> |
| KENNEDY, W. P. | 1934-35 | The polynuclear count in an Iraq population, <i>Trans. Roy. Soc. Trop. Med. and Hyg.</i> , xxviii, 475 |
| KENNEDY, W. P., AND MACKAY, I. | 1935-36 | Further studies on the polynuclear count in Iraq, <i>Ibid.</i> , xxxix, 291 |
| " " " " | 1936 | The normal leucocyte picture in a hot climate, <i>J. Physiol.</i> , lxxxvii, 336 |
| PAI, H. C. | 1935 | A comparison of the polynuclear count in healthy and diseased subjects in Moukden (China) and in Great Britain, <i>this Journal</i> , xl, 381 |
| " | 1936 | The polynuclear count in health and disease and its significance in China, <i>Chinese Med. J.</i> , Supp. no. 1, 13 |
| SHAW, A. F. B. | 1936 | The polynuclear count in Egyptians and British subjects resident in Egypt, <i>this Journal</i> , xlii, 165 |

621 527 4

A SIMPLE AND EFFICIENT WATER TRAP FOR
A WATER SUCTION PUMPI. MURRAY POTTAM, Walter and Eliza Hall Fellow
Veterinary Research Institute, the University of Melbourne

One of the objections to the more general use of the ordinary water suction pump for supplying a negative pressure for filtration is the fact that at the moment the water is turned off the negative pressure in the filtration system draws water back through the pump thus diluting and contaminating the filtrate. To overcome this difficulty many water traps or valves have been designed. These as a rule only remain efficient for a short time as moving parts have a tendency to stick or wear. The following is a description of a new type of valve in which the moving parts are reduced to a minimum and there is little or no wear. The component parts of the apparatus are relatively cheap and are readily available in any ordinary laboratory. Once set up the valve should continue to function for many years as the only part subject to wear is the small piece of rubber tube in the upper chamber and this can be easily replaced if it should perish. The original water trap has been in use for over a year and continues to give efficient service.

In this description the dimensions given are those of the original apparatus but they can easily be altered to suit local conditions. The body of the instrument (fig.) consists of a thick walled glass cylinder 28 cm long and 4 cm in diameter the walls being 0.25 cm thick. The ends are closed by two rubber bungs and the cylinder is divided into a small upper chamber (5 cm long) and a large lower chamber (17 cm long) by a third rubber bung. The communication between the upper and lower chambers is through a glass tube with an external diameter of 0.65 cm. This is inserted through the centre of the middle bung and its upper opening is just below the level of the top of this stopper. The lower end is bevelled at an angle of 40 to 45° and the point presses slightly into the lower bung. This bevel can be cut by means of a sharp file or an emery or sand stone, and the tube is inserted into the middle bung before the latter is placed in position. The opening between the upper and lower chambers is closed by a valve made from a short length of ordinary red rubber tubing 1.6 cm ($\frac{5}{16}$ in) in diameter, and about 2.5 cm long the wall being 0.25 cm ($\frac{1}{16}$ in) thick. The tube rests on its side in the horizontal position and is compressed vertically by means of a glass rod 0.65 cm in diameter, the upper end of which passes through the centre of the top stopper while the lower end is mushroomed out to form a disc a little over 2 cm in diameter. The tube is not completely flattened out but is compressed to reduce its lumen to 2.3 mm at its narrowest point (i.e. over the opening in the centre bung). The pressure on the valve can be regulated by raising or lowering the glass rod. The connection for the water suction

Sketch of apparatus
× $\frac{1}{4}$

pump is a glass tube 0.65 cm in diameter passing through the top stopper and opening into the top of the upper chamber. The connection for the filtration system, pressure gauge, etc. is a similar tube passing through the lower stopper and opening near the top of the lower chamber.

When the pump is in operation the negative pressure produced causes the compressed tube in the upper chamber to lift away from the opening in the middle bung, thus permitting a free passage of air from the filtration system to the pump. Only a small negative pressure is necessary to overcome the elasticity of the tube and to compress it against the flattened end of the glass rod. When the pump is turned off the valve closes immediately, owing partly to the elasticity of the valve, partly to the negative pressure in the lower chamber and filtration system. The pressure of water passing from the pump into the upper chamber probably assists in closing the valve.

The lower chamber is included as an additional safety device, as, should the valve fail to close, the water would have to fill the lower chamber completely before it could flow out through the connection to the filtration system. As it is estimated that this chamber would hold from 150 to 200 ml. there would be ample time in which to disconnect the filter. So far it has not been necessary to do this. Occasionally one or two drops of water will make their way past the valve, particularly if a negative pressure is maintained for any length of time after the pump has been turned off. Large or small quantities of water passing into the lower chamber are automatically removed the next time the pump is operated.

It is necessary to use a thick walled glass tube for the outer cylinder as it will have to withstand a considerable pressure when in use.

As the fragment of rubber tube used for the valve will show a tendency to swell after it has been submerged in water for some time, it is necessary to cut it rather short when fitting it in place. In addition, the rubber fatigues after it has been in use for several weeks and the tube remains permanently moulded into its compressed shape, but as it retains its elasticity it will continue to function efficiently. The valve is clearly visible through the wall of the glass cylinder and can be inspected from time to time for cracks or other evidence that it is perishing.

The whole instrument is small and can be fitted to the wall or some convenient object near the pump. The original apparatus is fastened to the stand of the mercury manometer by small wire clips.

The instrument can be tested for air leaks by attaching the lower connection to a pressure gauge and operating the pump until a fair degree of negative pressure is recorded. The pump is then turned off and the instrument left for several hours. There should be little or no alteration in pressure during this period.

576 809 72 576 851 3 (*V. cholerae*)

THE O RECEPTOR COMPLEX OF *V. CHOLERA* AND ITS ANTIBODIES

P BRUCE WHITE

National Institute for Medical Research, London, N W 3

In agglutination and agglutinin absorption tests the Inaba ("original"), Hikojima ("middle") and Ogawa ("variant") types of *V. cholerae* behave as if their heat stable O antigens had the general structure AX, ABX and BX—X being a common factor and A and B, differentiating the Inaba and Ogawa types, being combined in the Hikojima (middle) type. Though Scholtens (1936) offers a very different interpretation, I am satisfied that

these are the broad facts. The observations summed up here concern only the Inaba and Ogawa types—the dominant or only types of *V. cholerae* isolated in India.

Antisera prepared by injecting Inaba and Ogawa type vaccines into rabbits vary widely in their O antibodies between high type specificity (acting very selectively on the homologous type) and group specificity (agglutinating the *V. cholerae* types to approximately the same titre though not acting appreciably on other vibrios). While in my own experience the most extreme examples of type specific sera have been of the Ogawa type, a greater proportion of Inaba than of Ogawa type sera have leaned towards type specificity. Group specific sera always contain a certain amount of type specific agglutinin which is unmasked on saturation of the serum with the heterologous type. The decision as to the type specificity or group specificity of a serum seems to lie mainly or entirely with the individual rabbit injected. It has been repeatedly observed that the same vaccine similarly administered to a series of rabbits may stimulate in some dominantly type specific O antibodies and dominantly group specific O antibodies in others. This uncertainty in agglutinin response must complicate to a certain extent any scheme for the partial standardisation of the agglutination test for *V. cholerae* by the issue to different laboratories of "standard" vaccines for local preparation of agglutinating sera.

Since those O receptors which are appreciably concerned in the agglutination of living smooth cholera vibrios are located in the specific polysaccharide characteristic of the smooth organism, a number of rabbits were immunised with various preparations of the protein free specific substance in the hope that, should the material prove to be antigenic, the agglutinin response might be of a more constant nature than when ordinary vaccines are used. The polysaccharide preparations employed corresponded with the S fraction I of White (1936a) as modified by omission of treatment with hot acetic acid (White, 1936b). The fractions were found to be actively antigenic and sera agglutinating *V. cholerae* at 1:2000 dilution were readily obtained, but these showed precisely the same range of variability between type and group specificity as did sera prepared against intact vibrios. It is possible that such anti polysaccharide sera may nevertheless have certain advantages such as complete freedom from H and Q agglutinins (White, 1935b). The experiments referred to were made with the single object of preparing diagnostic sera and no comprehensive study of the antigenicity of the various carbohydrate components of the vibrio has yet been undertaken. For instance it has not been determined whether the protein free antigen referred to above is strictly a polysaccharide or is a polysaccharide containing complex of the type described by Boivin and by Topley and their respective co-workers.

The S polysaccharide fixes and inactivates type specific and group specific smooth O antibodies, but on exposure to alkali is so damaged that with many anticholera sera it no longer reacts visibly (White, 1935a). A recent paper by Linton and Mitra (1936/37) shows that on exposure to alkali the cholera polysaccharide suffers deacetylation—it is therefore very possible that the change in reactivity I have observed is due to loss of acetyl groups.

With certain anticholera sera, however, the alkali treated (? deacetylated) smooth polysaccharide continues to react, precipitating and effecting a partial fixation of agglutinins.

This raises the question of the relations of the type specific and group specific receptors of the S polysaccharide to its alkali labile and alkali stable receptors. A large number of anticholera sera (about 90) prepared against living vibrios, vibrios killed with alcohol, vibrios heated at 56° or 100° C

and against the specific polysaccharides of the Inaba and Ogawa types, were examined without discovering any definite correlation between type and group specificity in agglutinative action and reactivity to the alkali labile and alkali stable precipitating factors. The impression gained was that the alkali labile and alkali stable factors must both contribute to type and to group reactions.

TABLE I

Analysis of V cholerae O antibodies by precipitation and precipitation fixation tests

Treatment of Ogawa type O ⁺ anticholera serum			Ring precipitation tests with				Deductions
			Ogawa type polysaccharide		Inaba type polysaccharide		
			Undamaged	Alkali stable	Undamaged	Alkali stable	
Untreated serum dil 3 5			+	+	+	+	
Serum (dil 3 5) saturated with	Ogawa type polysaccharide	Undamaged	-	-	-	-	1 The undamaged Ogawa poly saccharide carries all relevant receptors
		Alkali stable	+	-	+	-	2 There are group specific receptors which, not being present in the alkali stable polysaccharide, must be associated with the labile factor
	Inaba type polysaccharide	Undamaged	+	+	-	-	3 Type specific receptors are borne not only by the undamaged but also by the alkali stable Ogawa poly saccharide
		Alkali stable	+	+	+	-	4 Deduction as in 2

To obtain more exact information samples of Inaba and Ogawa type O antisera with strong group agglutinins and reacting with the alkali stable substance were respectively saturated with the whole and alkali treated polysaccharides of both vibrio types. Two parts of polysaccharide solution (known excess) were added to 3 parts of serum and after standing overnight the mixtures were filtered through Seitz discs prepared for the purpose by previous passage of normal rabbit serum (Yang and White, 1934). With the filtered sera, ring precipitation tests were performed with solutions of the polysaccharide preparations. It is probable that the heavy precipitation which had already occurred in the sera, by partly removing material

TABLE II
Analysis of *V. cholera* O antibodies by agglutination and adsorption fraction tests

	Type of <i>V. cholera</i> tested for agglutination	Ogawa type O antibody reactions					Isolated fraction
		1:100	1:50	1:25	1:10	1:5	
Untreated serum	Ogawa Inaba	+	+	+	+	+	The unadsorbed fraction carries all the adsorbed antigen. Residual adsorptive albumins show that part of the type specific receptors are associated with the alkali labile factor. Covers the total type specific titre of the serum.
	Ogawa Inaba	+	+	+	+	+	
	Ogawa Inaba	+	+	+	+	+	
	Ogawa Inaba	+	+	+	+	+	
	Ogawa Inaba	+	+	+	+	+	
Serum saturated with	Further saturated with Inaba type vibrios	+	+	+	+	+	Shows that all relevant receptors for the Inaba type are carried by the undamaged Inaba polysaccharide. Residual albumins for both types prove that certain group receptors are associated with the alkali labile factor, reduction in titre that group receptors are also carried by the alkali stable polysaccharide.
	Inaba type vibrios (at 1:50 diln)	+	+	+	+	+	
	Undamaged Inaba polysaccharide	+	+	+	+	+	
	Alkali stable Inaba polysaccharide	+	+	+	+	+	

(? lipoids) essential to precipitation, weakened the visible reactions of remaining antibodies. The positive reactions observed were, though distinct, not vigorous. The results obtained with an Ogawa type serum (anti-strain "Shillong 610") are presented in simple form, with collateral deductions, in table I, p 708.

Comparative agglutination tests were also performed with the samples of absorbed and unabsorbed sera and the results, again with collateral argument, are assembled in table II, p 709.

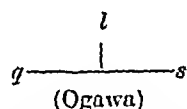
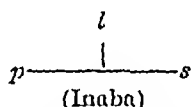
These experiments, with corresponding tests on a similar Inaba type serum, lead me to the conclusion that each type presents at least four O receptor groups, two, of which one is alkali labile the other alkali stable, being type specific, and two, of which one is alkali labile the other alkali stable, being common to both types. The experimental indications might be expressed by the formulae

Inaba type —ACXZ

Ogawa type —BCYZ

It is not to be assumed that these factors represent so many different substances in the polysaccharide fraction of the vibrio. Advances in other fields render it conceivable that in each type of *V. cholerae* a single smooth polysaccharide is concerned in smooth O serology and that serological multivalence is due to individual receptor groupings in the molecule and to combinations of these acting as complex receptors.

The simplest conception which would seem to offer a plausible explanation of the facts along these lines is to imagine the cholera polysaccharide as a molecule possessed of 3 primary receptor groupings: an alkali stable group *s* and an alkali labile group *l* common to both types, and a type specific alkali stable receptor group *p* (or *q*)



Then the experimental receptor group A might be furnished by *pl* or *ps*, B by *ql* or *qs*, C by *l* or *s*. X and Y would correspond to *p* and *q* respectively and Z to *s*. Such speculation may at least serve as a basis for further argument.

Thus much is certain, the cholera polysaccharide possesses a number of receptor groupings some of which are type specific, some group specific, some alkali labile, some resisting alkali, and that in the rabbit now one now another of these receptors plays the dominant role in stimulating antibodies.

REFERENCES

- | | | |
|---------------------------|---------|---|
| LINTON, R. W., AND MITRA, | 1936-37 | <i>Indian J. Med. Research</i> , xxiv |
| B. N. | | 323 |
| SCHOLTEMS, R. TH. | 1936 | <i>Ann. Inst. Pasteur</i> , lvi 68 and 710,
and Report of proceedings of
Second International Congress for
Microbiology, London, p. 304 |
| WHITE, P. BRUCE | 1935a | <i>this Journal</i> , xi 567 |
| " " | 1935b | <i>J. Hyg.</i> , xxv 498 |
| " " | 1936a | <i>Brit. J. Exp. Path.</i> , xvii 229 |
| " " | 1936b | <i>this Journal</i> , xliii 591 |
| YANG, Y. N., AND WHITE, | 1934 | <i>this Journal</i> , xxxviii 187 |
| P. BRUCE | | |

BOOKS RECEIVED

The adrenals

By ARTHUR GROLLMAN. London. Baillière, Tindall & Cox. 1936.
Pp. vii and 410. 17 figs. 22s. 6d.

Dr Grollman is associate professor of pharmacology and experimental therapeutics and was formerly associate professor of physiology in the Medical School of the Johns Hopkins University and it is on the physiological and pharmacological aspects of the adrenals that he writes with obvious authority and precision. To the pathologist reader perhaps the most interesting chapters are those concerning the adrenogenital syndrome and the relation thereto of what the author has called the androgenic tissue. This is his term for the embryonic tissue which makes up the great bulk of the foetal adrenal and which undergoes almost complete involutionary atrophy during the first year or two of extra-uterine life. Grollman believes that most or all of the adrenal rests encountered in new born children—those occurring along the internal spermatic vessels on the ilio psoas muscle, in the rete testis, in the broad ligament and ovary, etc.—are composed of this self same tissue and that they are equally transient disappearing at an early age. It is undue survival, hypertrophy, and especially neoplasia of this androgenic zone which are associated with adrenal virilism and certain hermaphroditic conditions." The term androgenic is introduced to indicate this functional masculinizing potentiality. There is no relation between adrenal virilism and the adult cortex or its tumours. The author admits that experimental proof of his hypothesis is lacking but he adduces a number of arguments in its support and the publication of his views will no doubt stimulate work in this obscure and interesting field. It is the more to be regretted that he has not given a better and more fully illustrated account of the histological characters of this tissue in its various phases especially in man. Grollman suggests that it is this tissue which gives the fuchsinophil reaction, demonstrated by Broster and Vines, in cases of adrenal virilism and at certain stages of development in both male and female fetuses.

In general the pathological and anatomical sections of this book are much less satisfactory than the physiological and pharmacological, and there is much overlapping and repetition. Why is the naked-eye appearance of the normal human adrenal so often wrongly described? Here is Grollman's version. "When cut into they are seen to consist of a firm external or cortical portion deep yellow in color, and striated, forming the greater mass of the gland, and an internal or medullary soft and pulpy portion, of dark brownish appearance due to the presence of blood." This dark brown colour of the normal medulla is a hoary fallacy which one is constantly meeting. In strict fact the condition of the medulla ranges from white or grey to pink, and it is if anything firmer than the cortex. The "dark brownish" 'soft and pulpy' layer is the zona reticularis with its abundant brown pigment, and as the medulla, especially of the left adrenal, may occupy only a very small space in the centre, the two layers of the zona reticularis are

often extensively in contact this may partly explain the error. It is in the zona reticularis that cavitation occurs when unduly soft glands are cut across *post mortem*. The relatively tiny medulla (about 10 per cent of the whole gland according to Grollman) will be found adhering to one side of the cavity or even lying more or less free within it.

There is an excellent chapter on Addison's disease, in which the clinical picture is largely given in Addison's own words. But the estimate that only 10 per cent of cases are due to atrophy certainly does not apply to this country.

The book as a whole is inadequately illustrated and the text marred by occasional illiterate usage. Nevertheless it gives a good account of the present state of adrenal endocrinology and is welcome accordingly. There is a useful bibliography of over seven hundred references.

Warzen, Papillome und Krebs

By JÓSEF BALÓ and BÉLA KORRÁSSY. 1936. Budapest. Karl Renyi. Leipzig. Johann Ambrosius Barth. Pp 303, 111 text figs. RM 20.

Common things often fail to attract attention by their very familiarity. With this thought in mind the authors have expended much effort in investigating such simple things as warts of all kinds, patches of leukoplakia in the œsophagus, polyps in the colon, etc., including similar conditions in animals. Particularly have they considered these conditions to determine whether they shed any light on the problem of cancer. Unfortunately, after reading their book, one finds one has learnt little new either about the problem of cancer or the ætiology of the conditions themselves.

After examining a large number both of living patients and of bodies at autopsy and discussing the relevant literature, they conclude that the common wart, the flat wart, condyloma acuminatum and laryngeal papilloma show the highest frequency in children and that they are all virus infections. On the other hand, senile (seborrhœic) warts occur more commonly as the patient gets older, cannot be transmitted to other patients experimentally and are of a different ætiology. Their most striking conclusion, based on over 600 cases between the ages of 45 and 64, is that cancer is nearly three times more frequent in those with senile warts than in those without, and that probably it is more frequent in those with many warts than in those with few. The difference grows less at greater ages owing to the increasing incidence of senile warts. The authors stress the diagnostic significance of senile warts as an indication of a tendency towards cancer and ask if they play any part in its ætiology. In considering this question they discuss the chemical structure of carcinogenic substances and suggest that these may be formed in the sebaceous glands lying in relation to the senile warts. Injection of pulverised wart substance into animals has so far failed to produce cancer but still they suggest that these warts should be excised as a prophylactic measure.

Further statistics show the related frequency of leukoplakia of the œsophagus, polyps in the colon and senile warts and the authors claim that all these are indications of a tendency to epithelial proliferation and ultimately to cancer, possibly the same ætiological factor postulated above is at work as well.

The rest of the book is chiefly a discussion of the literature concerning polyps and warts in other sites, *e.g.* the bladder, and in animals. The book represents much work but contains little new. It does, however,

give a statistical basis for various well known clinical observations such as the marked frequency of the common wart in children as compared with adults and each chapter has a good bibliography. It must be added that all conclusions drawn from their data are significant statistically and a brief chapter on their statistical methods is given at the end.

Complement or alexin

By T. W. B. OSBORN. London: Humphrey Milford, Oxford University Press, 1937. Pp. xi and 116. 7s. 6d.

This useful and modest little monograph gives a well arranged account of the peculiarities and properties of complement or alexin. It is well worth reading particularly by anyone commencing to do Wassermann or other complement fixation tests, as it will give him a good understanding of the most difficult and exasperating of his reagents. The literature of complement is ~~very~~ extensive but we cannot suggest any serious omission. In this respect the work calls for praise as it is rare to come across a book on a bacteriological or immunological topic to which the term 'classic' can be properly applied. One rather wonders why the famous passage from *The Republic*, on men in caves, should have been considered a relevant motto for a monograph on complement. If tags are necessary why not something more topical such as 'life is short, experiment uncertain' or 'tis here, 'tis there 'tis long'."

Principles of biochemistry

By A. P. MATHEWS. London: Bulliere Tindall & Cox, 1936. Pp. x and 512. 20s.

In the preface to this book Professor Mathews points out how difficult it is for the medical student, with his slender knowledge of organic chemistry, to appreciate the subject of biochemistry, which is daily becoming more complex both in its chemical and physiological aspects. His object in writing this book, after nearly forty years of experience in teaching biochemistry to medical students, is an endeavour to make biochemical happenings in the human body more co-ordinated and therefore more easily understood by the medical student.

This book contains much of the usual material found in text books of biochemistry for medical students, presented however, in a somewhat unusual manner. Thus after a brief introduction to the chemistry of carbohydrates in the earlier pages, the first 140 pages are devoted to a discussion of carbohydrate metabolism. This method of treatment, in which quite obviously considerable reference has to be made to many types of compounds and of phenomena of which the student has no knowledge at this stage, is one the wisdom of which is open to debate. It means that there necessarily have to be many explanations and definitions of terms used, the brevity of which may easily lead to considerable confusion in the student's mind. Professor Mathews lays great emphasis on the statement that 'the fundamental chemical change in every kind of cell of the body, and probably every kind of cell there is, concerns the metabolism of dextrose', and while this is doubtless largely true, it has led to an over-elaboration of the carbohydrate section. Detailed discussion of the intricate mechanism of fermentation of sugar by yeast, with the inclusion even of the formula of nicotine

acid amide and of a provisional chemical formula for co zymase, seems out of place in a medical student's text book. This type of criticism is applicable in general to the book as a whole. Thus, while the important and interesting series of chemical relationships between the sterols, bile acids, cardiac glucosides and the sex hormones are amply discussed, it seems hardly necessary to include in full 21 complete formulae of these cyclopentano phenanthrene compounds. Similar criticism may be made of the excessive chemical treatment of chlorophyll and the blood and bile pigments, and also of the setting out in detail of a scheme whereby a polyene chain after condensation with nitrous acid could give rise to a porphyrin derivative.

Those who are familiar with Professor Mathews' larger work will look forward to finding this book written in an easy and interesting manner and in this they will not be disappointed, for Professor Mathews says openly in his preface that in correlating known knowledge, he may at times have gone beyond what is strictly proven. Many of his attempts to link up known isolated facts are extremely interesting and add greatly to the pleasure of reading the book.

This book, which is very up to date in many respects, is full of stimulating suggestions and contains much of the modern chemical work on biochemical products. It is not, however, a book for medical students who, coming to the study of biochemistry with no more than an elementary knowledge of organic and physical chemistry, will find themselves in difficulty. It should, on the other hand, prove a valuable book for advanced students reading for honours degrees in the subject and as a source of up to date information for people already possessing some knowledge of biochemistry.

INDEX OF SUBJECTS

	PAGE		PAGE
ACTIVIMETHYL CARBINOL in bacterial fermentation	679	CHORDO LY SPHERO-OCIPITAL	41
ADRENALS changes associated with oestrin administration and mammary cancer	633	CHORIO ALLANTOIS of developing chick histology of	359
ALLERGIC HYPERSENSITIVENESS and immunity	643	COPPHOSIS OF LIVER experimentally produced by intravenous injection of silicious dust	549
ANEURYSM multiple of splenic artery in familial telangiectasia	29	<i>Cl. adenomatous</i> toxin production by	379
ANTIBODIES in syphilis to <i>T. cholerae</i>	399	COLCHICINE effect on normal and neoplastic tissues in mice	469
ANTIGEN Vi relation to agglutinability of <i>B. typhosus</i> by trypan flavine	706	COLIFORM BACILLI in intestine of children	221
ANTIGENIC BASIS of tumour transplantation	349	in water growth of	167
ARTHRITIS metabolism of joint tissues in	691	COPPER in peptones influence on growth of certain pathogens	225
AVIAN SARCOMA AGENTS, particulate nature of	247	<i>C. diphtheriae</i> isolation and typing on tellurite blood agar	235
BACILLI coliform growth in water	167	CULTURE MEDIA influence of copper in tellurite blood agar for isolation and typing of <i>C. diphtheriae</i>	225
<i>B. a. latens</i> relation to <i>B. coli</i>	485	CYTOTOLOGY of acicinal keratitis in rabbit	235
<i>E. coli</i> relation to <i>B. aviaticus</i>	485	CYTOTOXINS method of demonstrating effects of	357
<i>B. notyi</i> toxin production by	379		515
<i>B. pyocyaneus</i>	567	DIABETES INSIPIDUS, anatomical basis for resistance to pituitrin in	305
<i>B. typhosus</i> agglutinability by trypan flavine relation of Vi antigen	349	DIBENZANTHRACENE vital staining during carcinogenesis by	19
BACTERIAL FERMENTATION, origin of acetylmethylcarbinol in	679	DOG, aetiology of benign enlargement of prostate in	113
BACTERIOPHAGE in group of lactic streptococci	337	EPENDYMA relation of gliosis to tumours of	661
of lysogenic strains of <i>T. cholerae</i> and influence of lysozyme on cholera phage activity	276	<i>Fasciola hepatica</i> human infestation with	485
<i>Bact. coli</i> from diseased calves classification of	125	FLUKE human infestation with <i>Fasciola hepatica</i>	485
BENZENE, toxicity of certain chlorine derivatives of	281	GASTRO ENTERITIS coliform bacilli in	321
BLOOD macropolymer in health and disease in Iraq	701	GENETIC BASIS of tumour transplantation	691
BOOKS RECEIVED	279 509	GLIOSIS, relation to tumours of ependymal origin	661
CALVES, classification of <i>Bact. coli</i> from diseased	125	HAY FEVER effect of pollen therapy on skin reactions	559
CARCINOGENESIS, EXPERIMENTAL particulate nature of avian sarcoma agents	141	reaction inhibiting substance in serum of treated patients	593
results of vital staining in tar di benzantracene and benzpyrene carcinogenesis in mice	19	HETEROTOPIA intestinal in gastric mucosa	359
CARCINOMA of breast adrenal changes in mice with	633	IDIOTICITY dissociation of allergic hypersensitiveness and	643
of uterus of rabbit with splenic metastases	492	protective antibodies in syphilis	399
transplantable, of domestic fowl	1	INCLUSION BODIES in vaccinal keratitis in rabbit	357
CHICK EMBRYO histology of normal chorio allantois	369	in vessels of brain and cord in rabbits	315
		INFARCTION toxic of liver	297

	PAGE		PAGE
INFLUENZA, aetiology of	213	RABBIT, comparative value of vaccines and toxoid in experimental staphylococcal infection in	573
distribution of virus in experimentally infected mice	559	cytological features of vaccinia keratitis in	357
INTESTINAL EPITHELIUM in gastro mucosa	389	RABIES, intra-endothelial bodies in vessels of brain and cord in	315
INTESTINAL FLORA of children	321	RHABDOMYOSIA AND MYOBLASTOMA	517
JOINT TISSUES, metabolism of	247		
LEUCOCIDINS, staphylococcal, inter relationships of	425	SARCOMA, avian, particulate nature of agents of	141
LEUCOCYTES macropolyocyte in health and disease in Iraq	701	SEROLOGY precipitation reactions of normal serum and lipid suspensions	603
LIPOID SUSPENSIONS, precipitation reactions of normal serum and	603	SILICOSIS experimental cirrhosis of liver from intravenous injection of silicious dust	549
LIVER cirrhosis produced by intra venous injection of silicious dust	549	SPLEEN, carcinoma of uterus of rabbit with metastases in	492
massive necrosis following intraportal administration of poisons	297	multiple necrosis of	103
LISOZYME influence on cholera phage activity	276	myeloid transformation of	99
METABOLISM of joint tissues	247	SPLENOMEGALY with myeloid transformation	99
MOUSE, acquired resistance to œstrone in	699	STAPHYLOCOCCAL LEUCOCIDINS, inter relationships of	425
adrenal changes associated with œstron administration and mammary cancer in	633	STAPHYLOCOCCUS value of heat-killed vaccines and toxoid in staphylococcal infection of rabbit	573
changes induced by œstrone in bulbo urethral gland of	481	STAPHYLOCOCCUS TOXIN factors controlling production in fluid medium	47
distribution of influenza virus in experimentally infected	559	STOMACH, intestinal epithelium in mucosa of	389
effect of colchicine on normal and neoplastic tissues of	469	STREPTOCOCCI, bacteriophage in lactic group of	337
vital staining during carcinogenesis by tar, dibenzanthracene and benzpyrene in	19	STREPTOCOCCUS, HÆMOLYTIC, heat labile toxin of	71
MYELOID TRANSFORMATION of spleen	99	in puerperal infection	91
NECROSIS, multiple, of spleen of liver following intraportal administration of poisons	103	SYPHILIS, protective antibodies in	399
	297	SYRINGOMYELIA with intramedullary tumour	661
OBITUARY NOTICES—		TECHNIQUE "cellosolve" for rapid dehydration	269
Edgar Hartley Kettlo (portrait)	493	frozen sections of oyes	369
Oskar Klotz (portrait)	504	staining methods for islets of Langerhans	272
ŒSTRONE, acquired resistance to, in male mouse	699	water trap for water suction pump	709
adrenal changes associated with administration of	633	TELANGECTASIA, FAMILIAL HÆMORRHAGIC, with multiple aneurysms of splenic artery	29
changes induced in bulbo urethral gland of mouse by	481	THYROID, malignant tumours of	463
o DICHLOROBENZENE, toxicity of	281	TOXIN, erythrogenic, of hæmolytic streptococcus in puerperal infection	91
PANCREAS staining methods for islets of Langerhans	272	heat labile, of hæmolytic streptococci	71
PARATHYROID GLANDS, weight of	431	production by <i>Cl. adematensis</i>	379
PITUITARY, resistance to in diabetes insipidus	305	staphylococcus factors controlling production in fluid medium	47
PRECIPITATION REACTIONS of normal serum and lipid suspensions	603	TOXOID as immunising agent against experimental staphylococcal infection in rabbit	573
PROCEEDINGS OF THE SOCIETY	513	TRYPAFLAVINE, agglutinability of <i>B. typhosus</i> by	349
PROSTATE aetiology of benign enlargement in dog	113	TUMOURS, ANIMAL adrenal changes associated with œstron administration and mammary cancer	633
<i>Pseudomonas pyocyanea</i>	567	carcinoma of uterus of rabbit	492
PUERPERAL INFECTION, erythrogenic (Dick) toxin of hæmolytic streptococcus in	91		

	PAGE		PAGE
TUMOURS <i>EXPERIMENTAL</i> effect of calcichrome on normal and neoplastic tissues in mice	469	<i>Cholera</i> , lysogenic strains of influence of lysozyme on cholera phage activity	276
genetic and antigenic basis of tumour transplantation	691	O receptor complex of	706
histogenesis of mixed tumours	1	Viruses, alleged transmutation in	490
method of demonstrating effects of cytotoxins	515	Viruses etiology of influenza	213
particulate nature of avian sarcoma agents	141	an interference phenomenon in relation to yellow fever and other viruses	405
transplantable carcinoma of domestic fowl	1	etiology of vaccinia keratitis in rabbit	377
TUMOURS <i>HUMAN</i> intramedullary tumour with syringomyelia	661	distribution of influenza virus in experimentally infected mice	559
malignant tumours of thyroid	463	intra endothelial bodies in vessels of brain and cord in rabies	315
rhabdomyoma and myoblastoma	517	particulate nature of avian sarcoma agents	141
sphenoccipital chordoma	41	transplantable carcinoma of domestic fowl	1
UTERUS carcinoma with splenic metastases in rabbit	402	VITAL STAINING with phenol red during carcinogenesis in mice treated with tar, dibenzanthracene and benzpyrene	19
VACCINES as immunising agent against experimental staphylococcal infection in rabbit	573	WATER growth of coliform bacilli in	167
VACCINIAL KERATITIS, etiology of	357	YELLOW FEVER, interference phenomenon in	405

INDEX OF AUTHORS

	PAGE		PAGE
ALVES, W, <i>B asiaticus</i> its relation to <i>B coli</i>	485	with remarks on the relation of the gliosis to tumours of cependymal origin	661
AMIES, C R, the particulate nature of nvian sarcoma agents	141	CRAMER, W, and E S HORNING, adrenal changes associated with œstrin administration and mammary cancer	631
ANDERSON, C G, and T J MACKIE, the precipitation reactions of normal serum and lipid suspensions	603	D'AUNOY, R, and F L EVANS, the histology of the normal chorionic allantoic membrane of the developing chick embryo	369
BARRITT, M M, the origin of acetyl methylcarbinol in bacterial fermentation	670	DICKSON, W E C, C WORSTER DROUGHT and W H McMENEMEY, sphenoccephal chordoma	41
BAYLEY, J H, staining methods for the islets of Langerhans	272	DOWDIE, A W, a comparison of the value of heat killed vaccines and toxoid as immunising agents against experimental staphylococcal infection in the rabbit	573
BECK, A, the occurrence of protective antibodies in syphilis	399	EVANS, F L, and R D'AUNOY, the histology of the normal chorionic allantoic membrane of the developing chick embryo	369
BIGGART, J H, the anatomical basis for resistance to pituitrin in diabetes insipidus	305	FAIRBROTHER, R W, and L HOYLL, observations on the etiology of influenza	213
BIGGART, J H, human infestation with <i>Fasciola hepatica</i>	488	FINDLAY, G M, and F O MACCALLUM, an interference phenomenon in relation to yellow fever and other viruses	401
BIGGER, J W, the growth of coliform bacilli in water	167	FOULDS, L, a transplantable carcinoma of a domestic fowl, with a discussion of the histogenesis of mixed tumours	1
BLACKLOCK, J W S, K J GUTHRIE and I MACPHERSON, the intestinal flora of children	321	GILMOUR, J R, and W J MARTIN, the weight of the parathyroid glands	431
BURROWS, H, changes induced by œstrone in the bulbo urethral (Cowper's) gland of the male mouse	481	GLASS V, the isolation and typing of <i>C diphtheriae</i> on tellurite blood agar	235
BURROWS H, acquired resistance to œstrone in a male mouse	690	GORER, P A, the genetic and antigenic basis of tumour transplantation	601
BYWATERS, E G L, the metabolism of joint tissues	217	GROOME, J R, and S ZUCKERMAN, the etiology of benign enlargement of the prostate in the dog	113
CAMERON, G R W A E KARUNARATNE and J C THOMAS, massive necrosis ("toxic infarction") of the liver following intra portal administration of poisons	297	GUTHRIE, K J, J W S BLACKLOCK and I MACPHERSON, the intestinal flora of children	321
CAMERON, G R, and J C THOMAS, the toxicity of certain chlorinated derivatives of benzene, with special reference to o dichlorobenzene	281	HARE, R, the heat labile toxin of hæmolytic streptococci	71
CAFFELL, D F, and G L MONTGOMERY, on rhabdomyoma and myoblastoma	517	HARLEY, D, hay fever (I) the effect of pollen therapy on the skin reactions (II) a reaction inhibiting substance in the serum of treated patients	569
CLEARAN, P A, the effect of colchicine on normal and neoplastic tissues in mice	460		
COLEBROOK, L, and M KLANY on the part played by the erythrogenic (Dick) toxin of the hæmolytic streptococcus in puerperal infection	91		
COLES, A C, intra endothelial bodies in the vessels of the brain and spinal cord in rabies	315		
Cox, L B, syringomyelia associated with an intra medullary tumour,			

	PAGE		PAGE
HUSCH, W. the agglutinability by trypsin of <i>B. typhosus</i> and its relation to the Vi antigen	349	MARTIN, W. J., and J. R. GILLOUT, the weight of the parathyroid glands	431
HOPKING, I. S., and W. CRAMER, adrenal changes associated with oestrin administration and mammary cancer	633	MOTOMORI, G. L., and D. F. CAPELLI, on rhabdomyoma and myoblastoma	517
HOOD, L., and R. W. LAIBROTH, observations on the etiology of influenza	213	OAKLEY, C. L., frozen sections of cells	365
HUNTER, C. J. I., and H. K. WHITEHEAD, the activity of bacteriophage in the group of lactic streptococci	337	OMURA, P. A. Q., and J. C. MACSWEE, the influence of copper in peptones on the growth of certain pathogens in peptone broth	225
JUSTI, R. G. the use of "cellosolve" for rapid dehydration in paraffin embedding and in the staining of sections	269	OPP, J. W. the results of vitals aiming with phenol red during the progress of carcinogenesis in mice treated with tar, dibenzanthracene and benzpyrene	19
KAPURATNE, W. A. E., G. R. CAMERON, and J. C. THOMAS, massive necrosis (toxic infarction) of the liver following intraperitoneal administration of poisons	297	OSTROVSKAYA, S. M., and A. A. SMORODINTSEFF, the distribution of influenza virus in experimentally infected mice	559
KENNEDY, W. P., and I. MACKAY, the macrophocyte in health and disease in Iraq	701	PAGEL, W. experiments on dissociation of allergic hypersensitive ness and immunity	643
KIN, A. M., and I. COLBROOK, on the part played by the erythrocytic (Dick) toxin of the hemolytic streptococcus in puerperal infection	91	PEARMAN, H. the inter relationships of staphylococcal leucocidins	425
LOVELL, R. classification of <i>Bacterium coli</i> from diseased calves	125	PILLAR, E. M. a simple and efficient water trap for a water suction pump	705
LUMDEN, F. a simple method of demonstrating the effects of cytotoxins	515	PEYMAN, C. C. and L. E. WALBURN, the production of toxin by <i>Cl. oedematis</i> (<i>B. nortyi</i>)	379
MACCALLUM, I. O., and G. M. LINDLAY, an interference phenomenon in relation to yellow fever and other viruses	405	RHODES, A. J. and C. E. VAN POOYE, some cytological features of vacuinal keratitis in the rabbit	357
MCCLURE, D. staphylococcus toxin factors which control its production in a fluid medium	47	SANDFORD, B. R. observations on <i>Pseudomonas pyocyanea</i>	567
MACKAY, I., and W. P. KENNEDY, the macrophocyte in health and disease in Iraq	701	SCHUSTER, N. H. familial haemorrhagic telangiectasia associated with multiple aneurysms of the splenic artery	29
MACKIE, T. J., and C. G. ANDERSON, the precipitation reactions of normal serum and lipid suspensions	603	SEASON, F. W. experimental cirrhosis of the liver produced by intravenous injection of sterile suspensions of silicious dust	549
McMENEMY, W. H., W. E. C. DICKSON, and C. WORTER DROUGHT, spheno-occipital chordoma	41	SMORODINTSEFF, A. A. and S. M. OSTROVSKAYA, the distribution of influenza virus in experimentally infected mice	559
MACINTOSH, I., J. W. S. BLACKLOCK, and K. J. GUTHRIE, the intestinal flora of children	321	THOMAS, J. C. and G. R. CAMERON, the toxicity of certain chlorine derivatives of benzene with special reference to o-dichlorobenzene	251
MACSWAIN, J. C. and R. A. Q. O'MURA, the influence of copper in peptones on the growth of certain pathogens in peptone broth	225	THOMAS, J. C., G. P. CAMERON, and W. A. E. KAPURATNE, massive necrosis (toxic infarction) of the liver following intraperitoneal administration of poisons	297
MAGNUS, H. A., multiple necrosis of the spleen	103	TUDHOPE, G. R. splenomegaly with myeloid transformation	99
MAGNUS, H. A., the presence of intestinal epithelium in the gastric mucosa	389	TWOOT, C. C. carcinoma of the uterus of the rabbit with splenic metastases	492

INDEX OF AUTHORS

- VAN ROOYEN, C L, and A J RHODES, 146
 some cytological features of vac-
 cinal keratitis in the rabbit
- VAUX, D M, malignant tumours of the
 thyroid gland 163
- WALNUM, L E, and G C REYMANN, 370
 the production of toxin by *C*
ordemansii (*B. novyi*)
- WHITF, P B, lysogenic strains of
V. cholerae and the influence of
 lysozyme on cholera phage activity 270
- WHITF, P B, regarding alleged trans-
 mutation in vibrios 400
- WHITF, P B, the O receptor compo-
 nent of *V. cholera* and its antibodies 157
- WHITMAN, H R, and G J
 HUNTER, the activity of bacteriophage in the group of lacto-
 streptococci
- WILKINSON DROUGHT, C, W I C
 DICKSON and W H McMEIKEN
 sphenocapital chordoma
- ZUCKERMAN, S, and J R GROOM, the
 aetiology of benign enlargement of
 the prostate in the dog

